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(SSC CPO AIR-29)

SSC Selection Post Phase-XIV 2026

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How to use this eBook: Solve each chapter's questions on your own first, then match them with the answer key, and only then read the detailed explanations. Click any question number to jump straight to its explanation, and click the number on the explanation to come back to the question. The answer key numbers are clickable too. Press **GO TO INDEX** on any page to return here.

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01 CHAPTER Number System

Questions *50 questions · 24 shifts*

Number System

Directions (Q. 01–50): *Choose the correct answer from the four given options.*

01 What is the binary equivalent of the decimal number 14?

SSC Phase-XIV (Graduation) 18 Sep 2026, Shift-I

(a) 1101 (b) 1111 (c) 1001 (d) 1110

02 Find the number of digits in the square root of 282429536481.

SSC Phase-XIV (Graduation) 19 Sep 2026, Shift-I

(a) 8 (b) 6 (c) 9 (d) 7

03 Which number system uses the digits 0-9 and the letters A-F?

SSC Phase-XIV (Graduation) 21 Sep 2026, Shift-I

(a) Binary (b) Octal
(c) Decimal (d) Hexadecimal

04 What is the unit digit of 17^{83}?

SSC Phase-XIV (Graduation) 21 Sep 2026, Shift-I

(a) 1 (b) 2 (c) 3 (d) 4

05 What is the hexadecimal representation of 4?

SSC Phase-XIV (Graduation) 23 Sep 2026, Shift-I

(a) 100 (b) 289 (c) 4 (d) 234

06 Find the unit digit of $999^3 + 888^2 + 777^1$.

SSC Phase-XIV (Graduation) 23 Sep 2026, Shift-I

(a) 4 (b) 6 (c) 2 (d) 0

07 What is the binary representation of 83?

SSC Phase-XIV (Graduation) 25 Sep 2026, Shift-I

(a) 1010011 (b) 123
(c) 53 (d) 83

08 How many zeros are there in the product $25 \times 20 \times 16 \times 40$?

SSC Phase-XIV (Graduation) 25 Sep 2026, Shift-I

(a) 4 (b) 6 (c) 2 (d) 8

09 What is the value of $(0.\overline{1} + 0.\overline{2} + 0.\overline{3} + \ldots + 0.\overline{8}) \div 4$?

SSC Phase-XIV (12th) 16 Sep 2026, Shift-II

(a) 1 (b) 5 (c) 9 (d) 7

10 Which of the following is equal to the decimal 7.8125?

SSC Phase-XIV (12th) 17 Sep 2026, Shift-II

(a) $\frac{63}{8}$ (b) $\frac{125}{16}$ (c) $\frac{113}{14}$ (d) $\frac{105}{13}$

11 If $2.\overline{36}$ means that the digits 36 recur after 2, then its value in fraction form is:

SSC Phase-XIV (12th) 17 Sep 2026, Shift-II

(a) $\frac{23}{9}$ (b) $\frac{78}{33}$ (c) $\frac{25}{11}$ (d) $\frac{118}{45}$

12 Which of the following statements is true about the relationship between rational and irrational numbers?

SSC Phase-XIV (12th) 17 Sep 2026, Shift-II

(a) Rational and irrational numbers belong to the same set.
(b) Rational and irrational numbers are mutually exclusive.

(c) All irrational numbers are rational numbers.
(d) All rational numbers are irrational numbers.

13 A decimal expression is given as (0.125 + 0.333333...) / (0.75 - 0.2). Convert all the decimals into fractions and find the simplified value.

SSC Phase-XIV (12th) 18 Sep 2026, Shift-II

(a) 5/6 (b) 6/5 (c) 1/1 (d) 5/5

14 A positive integer is given by $N = 2^3 \times 3^2 \times 5 \times 7^3$. By what smallest natural number should it be multiplied so that the product becomes a perfect square? What is the smallest multiplier required?

SSC Phase-XIV (12th) 18 Sep 2026, Shift-II

(a) 35 (b) 70 (c) 140 (d) 210

15 Three statements about number systems are given.
I. Every integer is rational.
II. Every whole number is an integer.
III. Every irrational number is real.
Which statements are always true?

SSC Phase-XIV (12th) 18 Sep 2026, Shift-II

(a) Only I and II (b) Only II and III
(c) Only I and III (d) I, II and III

16 What is the smallest number that must be subtracted from 9400 so that it becomes divisible by 23?

SSC Phase-XIV (12th) 19 Sep 2026, Shift-II

(a) 16 (b) 18 (c) 24 (d) 20

17 Identify the irrational number from the list given below:

SSC Phase-XIV (12th) 21 Sep 2026, Shift-II

(a) $(\sqrt{49})/2$ (b) $\pi/2$
(c) 2.5 (d) 0.333...

18 Identify the correct relation:
Every natural number is an integer, but every integer is not a natural number.
Every integer is a whole number.
Every rational number is an integer.
Every irrational number is a rational number.

SSC Phase-XIV (12th) 22 Sep 2026, Shift-II

(a) Every natural number is an integer, but every integer is not a natural number.
(b) Every integer is a whole number.
(c) Every rational number is an integer.
(d) Every irrational number is a rational number.

19 If a decimal number is written as 0.ababab... (a recurring block of 2 digits), what will be the denominator of its equivalent fraction?

SSC Phase-XIV (12th) 22 Sep 2026, Shift-II

(a) 100 (b) 99 (c) 990 (d) 9

20 Which of the following numbers cannot be expressed as the sum of two odd natural numbers?

SSC Phase-XIV (12th) 22 Sep 2026, Shift-II

(a) 12 (b) 26 (c) 50 (d) 33

21 Find the unit digit of the product of the first 10 odd natural numbers.

SSC Phase-XIV (12th) 23 Sep 2026, Shift-II

(a) 5 (b) 0 (c) 1 (d) 2

22 Four expressions are given in different forms. Select the number that is rational but not an integer.
$\sqrt{49}$
$\frac{-15}{5}$
$\frac{14}{4}$
$\sqrt[3]{-64}$

SSC Phase-XIV (12th) 23 Sep 2026, Shift-II

(a) $\sqrt{49}$ (b) $\frac{-15}{5}$ (c) 14/4 (d) $\sqrt[3]{-64}$

23 Find the smallest number to be added to 697221 so that the sum becomes a perfect square:

SSC Phase-XIV (12th) 24 Sep 2026, Shift-II

(a) 6 (b) 4 (c) 8 (d) 5

24 When a number is divided by 36, the remainder is 17. What will be the remainder when the same number is divided by 12?

SSC Phase-XIV (12th) 24 Sep 2026, Shift-II

(a) 2 (b) 5 (c) 3 (d) 7

25 A student adds an integer and an irrational number and claims that the result can be rational. If the integer is -3 and the irrational number is $\sqrt{11}$,

what is the nature of $-3+\sqrt{11}$?

SSC Phase-XIV (12th) 24 Sep 2026, Shift-II

(a) Natural number
(b) Integer
(c) Irrational number
(d) Terminating decimal

26 Which of the following represents a non-terminating but recurring decimal?

SSC Phase-XIV (12th) 25 Sep 2026, Shift-II

(a) 11/13 (b) 9/2 (c) 0.625 (d) $\sqrt{3}$

27 Which of the following fractions has a terminating decimal representation?

SSC Phase-XIV (12th) 25 Sep 2026, Shift-II

(a) 17/45 (b) 23/125 (c) 11/18 (d) 7/33

28 A set is formed as $S=(-2, 0, \frac{3}{4}, \sqrt{16}, \sqrt{15})$. Under the usual school convention where natural numbers start from 1, how many elements of S are natural numbers?

SSC Phase-XIV (12th) 26 Sep 2026, Shift-I

(a) 1 (b) 2 (c) 3 (d) 4

29 The decimal expansion of a rational number terminates only when, in lowest terms, the denominator has no prime factors other than 2 and 5. Which of the fractions given below has a non-terminating recurring decimal expansion?

SSC Phase-XIV (12th) 26 Sep 2026, Shift-I

(a) 13/40 (b) 7/12 (c) 28/125 (d) 9/20

30 What is the unit digit in $(149)^{123}\times(151)^{111}\times(155)^{55}$?

SSC Phase-XIV (Matric) 16 Sep 2026, Shift-III

(a) 0 (b) 5 (c) 1 (d) 2

31 If the number 91876 * 2 is completely divisible by 8, what is the smallest whole number that can replace "*"?

SSC Phase-XIV (Matric) 16 Sep 2026, Shift-III

(a) 2 (b) 3 (c) 1 (d) 4

32 Which statement is always true?

SSC Phase-XIV (Matric) 17 Sep 2026, Shift-III

(a) Every whole number is a natural number
(b) Every irrational number is a real number
(c) Every real number is rational
(d) Every integer is a whole number

33 Which of the following sets is empty?

SSC Phase-XIV (Matric) 17 Sep 2026, Shift-III

(a) Natural numbers ∩ Even numbers
(b) Integers ∩ Irrational numbers
(c) Whole numbers ∩ Rational numbers
(d) Real numbers ∩ Irrational numbers

34 Express the recurring decimal 0.41666... as a common fraction in its simplest form.

SSC Phase-XIV (Matric) 17 Sep 2026, Shift-III

(a) $\frac{6}{18}$ (b) $\frac{5}{12}$ (c) $\frac{3}{18}$ (d) $\frac{7}{15}$

35 What is the smallest number that must be added to 4321 so that the resulting number is exactly divisible by 37?

SSC Phase-XIV (Matric) 18 Sep 2026, Shift-III

(a) 8 (b) 1 (c) 12 (d) 15

36 0.875 in its simplest form is equal to which of the following?

SSC Phase-XIV (Matric) 18 Sep 2026, Shift-III

(a) $\frac{7}{8}$ (b) $\frac{3}{5}$ (c) $\frac{3}{2}$ (d) $\frac{5}{8}$

37 Which fraction is exactly equal to 0.04?

SSC Phase-XIV (Matric) 18 Sep 2026, Shift-III

(a) $\frac{1}{204}$ (b) $\frac{1}{20}$ (c) $\frac{1}{25}$ (d) $\frac{4}{25}$

38 Which set includes 0 but does not include −1?

SSC Phase-XIV (Matric) 19 Sep 2026, Shift-III

(a) Natural numbers (b) Whole numbers
(c) Integers (d) Irrational numbers

39 If x is a whole number but not a natural number, what is the value of x?

SSC Phase-XIV (Matric) 19 Sep 2026, Shift-III

(a) −1 (b) 0 (c) 1 (d) 2

40 Convert the decimal 5.125 into a mixed fraction in its simplest form.

SSC Phase-XIV (Matric) 19 Sep 2026, Shift-III

(a) $3\frac{4}{5}$ (b) $4\frac{1}{2}$ (c) $5\frac{1}{8}$ (d) $6\frac{3}{4}$

41 What is the unit digit of $\{(25)^{6251} + (36)^{528} + (73)^{54}\}$?

SSC Phase-XIV (Matric) 21 Sep 2026, Shift-III

(a) 1 (b) 2 (c) 4 (d) 0

42 If the number 48327*8 is divisible by 11, what is the smallest whole number that can replace "*"?

SSC Phase-XIV (Matric) 22 Sep 2026, Shift-III

(a) 2 (b) 1 (c) 3 (d) 4

43 Which of the following numbers is the largest? 0.47, $\frac{9}{20}$, $\frac{11}{25}$, $\frac{7}{16}$

SSC Phase-XIV (Matric) 22 Sep 2026, Shift-III

(a) 0.47 (b) $\frac{9}{20}$ (c) $\frac{11}{25}$ (d) $\frac{7}{16}$

44 Which of the following chains is correct?

SSC Phase-XIV (Matric) 23 Sep 2026, Shift-III

(a) Natural numbers $\subset$ Whole numbers $\subset$ Integers $\subset$ Rational numbers $\subset$ Real numbers

(b) Whole numbers $\subset$ Natural numbers $\subset$ Integers $\subset$ Real numbers $\subset$ Rational numbers

(c) Integers $\subset$ Whole numbers $\subset$ Natural numbers $\subset$ Rational numbers $\subset$ Real numbers

(d) Natural numbers $\subset$ Integers $\subset$ Whole numbers $\subset$ Rational numbers $\subset$ Real numbers

45 For which number is the statement 'the number is real but not rational' true?

SSC Phase-XIV (Matric) 23 Sep 2026, Shift-III

(a) 11 (b) −8 (c) $\sqrt{15}$ (d) 0.625

46 Find the smallest number that must be added to 12,567 to make it divisible by 119.

SSC Phase-XIV (Matric) 24 Sep 2026, Shift-III

(a) 28 (b) 47 (c) 72 (d) 91

47 What is the unit digit of $(348)^{124} \times (244)^{125}$?

SSC Phase-XIV (Matric) 24 Sep 2026, Shift-III

(a) 4 (b) 2 (c) 8 (d) 1

48 Which of the following fractions has a terminating decimal expansion?

SSC Phase-XIV (Matric) 24 Sep 2026, Shift-III

(a) $\frac{11}{40}$ (b) $\frac{24}{17}$ (c) $\frac{7}{60}$ (d) $\frac{45}{1030490}$

49 What is the smallest number that should be added to 7700 so that it becomes an exact multiple of 97?

SSC Phase-XIV (Matric) 25 Sep 2026, Shift-III

(a) 60 (b) 37 (c) 74 (d) 42

50 What is the unit digit of $(2153)^{167} \times (8267)^{153}$?

SSC Phase-XIV (Matric) 25 Sep 2026, Shift-III

(a) 2 (b) 7 (c) 5 (d) 9

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Answer Key *SSC official key*

Number System (Q. 01–50)

01	(d)	02	(b)	03	(d)	04	(c)	05	(c)	06	(d)	07	(a)	08	(a)	09	(a)	10	(b)
11	(b)	12	(b)	13	(a)	14	(b)	15	(d)	16	(a)	17	(b)	18	(a)	19	(b)	20	(d)
21	(a)	22	(c)	23	(b)	24	(b)	25	(c)	26	(a)	27	(b)	28	(a)	29	(b)	30	(b)
31	(b)	32	(b)	33	(b)	34	(b)	35	(a)	36	(a)	37	(c)	38	(b)	39	(b)	40	(c)
41	(d)	42	(b)	43	(a)	44	(a)	45	(c)	46	(b)	47	(a)	48	(a)	49	(a)	50	(d)

Detailed Explanations रटना बंद, समझना शुरू

Number System

01 ANSWER (d) 1110

SSC Phase-XIV (Graduation) 18 Sep 2026, Shift-I

Concept: Binary Break the number into powers of 2 (8, 4, 2, 1). Write 1 under every power that is used and 0 under every power that is not.

$14 = 8 + 4 + 2 + 0$, which means $2^3, 2^2, 2^1$ are used and 2^0 is not.

Now write the digits under the place values 8 | 4 | 2 | 1: 1 | 1 | 1 | 0. So 14 = $(1110)_2$, that is, **1110**.

Short Trick The binary form of an even number always ends in 0. Only 1110 ends in 0 among the options, so the question is done in 2 seconds.

02 ANSWER (b) 6

SSC Phase-XIV (Graduation) 19 Sep 2026, Shift-I

Rule: Digits in Square Root If a perfect square has n digits, its square root has $\frac{n}{2}$ digits (when n is even) or $\frac{n+1}{2}$ digits (when n is odd).

282429536481 has 12 digits in all. Make pairs from the right: 28 | 24 | 29 | 53 | 64 | 81, that is, 6 pairs.

Each pair gives one digit of the square root, so the square root will have **6** digits. (To check: $\sqrt{282429536481} = 531441 = 3^{12}$)

03 ANSWER (d) Hexadecimal

SSC Phase-XIV (Graduation) 21 Sep 2026, Shift-I

Concept: Number Systems Binary: 0-1, Octal: 0-7, Decimal: 0-9, Hexadecimal: 0-9 and A-F.

Hexadecimal has base 16, so it needs 16 symbols. Ten digits from 0 to 9, and A, B, C, D, E, F for 10 to 15.

Remember, the moment you see A-F, think **Hexadecimal**.

04 ANSWER (c) 3

SSC Phase-XIV (Graduation) 21 Sep 2026, Shift-I

Cycle: Powers of 7 The unit digits of powers of 7 come as 7, 9, 3, 1, and this cycle repeats after every 4 powers.

In 17^{83} only the unit digit 7 matters, so we just need to look at 7^{83}.

Divide 83 by 4. The remainder is 3. So it behaves like $7^3 = 343$, and the unit digit is **3**.

Examiner's Trap If the remainder comes out 0, take the fourth digit of the cycle (here 1). Writing 0 there is a mistake.

05 ANSWER (c) 4

SSC Phase-XIV (Graduation) 23 Sep 2026, Shift-I

Concept: Hexadecimal In hexadecimal, the digits 0 to 9 stay the same as in decimal. A to F are used for 10 to 15.

4 is smaller than 16, so nothing changes on conversion: $(4)_{10} = (4)_{16}$. The answer is simply **4**.

Examiner's Trap Don't get confused by 100. That is the binary form of 4, not the hexadecimal form.

06 ANSWER (d) 0

SSC Phase-XIV (Graduation) 23 Sep 2026, Shift-I

Concept: Unit Digit To get the unit digit of a sum, take only the unit digit of each term and add them.

In 999^3 we have $9^3 = 729$, unit digit 9 (an odd power of 9 always gives 9).
In 888^2 we have $8^2 = 64$, that is, 4.
777^1 simply gives 7.

Now $9 + 4 + 7 = 20$, whose unit digit is **0**.

07 ANSWER (a) 1010011

SSC Phase-XIV (Graduation) 25 Sep 2026, Shift-I

Concept: Binary Write the number as a sum of powers of 2: 64, 32, 16, 8, 4, 2, 1.

First break up 83:

$83 = 64 + 16 + 2 + 1 = 2^6 + 2^4 + 2^1 + 2^0$.

Under the places 64 | 32 | 16 | 8 | 4 | 2 | 1 the digits will be 1 | 0 | 1 | 0 | 0 | 1 | 1, so 83 = $(1010011)_2$. The correct option is **1010011**.

Short Trick Binary has only 0 and 1. The other three options contain digits like 2, 3, 5, 8, so reject them without a second thought.

08 **ANSWER (a)** 4

SSC Phase-XIV (Graduation) 25 Sep 2026, Shift-I

Concept: Trailing Zeros The number of zeros at the end is decided by the smaller of the power of 2 and the power of 5.

Break each number: $25 = 5^2$, $20 = 2^2 \times 5$, $16 = 2^4$, $40 = 2^3 \times 5$.

Total power of 5 = 2 + 1 + 1 = 4, and total power of 2 = 2 + 4 + 3 = 9. The smaller one is 4.
Check it: $25 \times 20 \times 16 \times 40 = 320000$, exactly **4** zeros.

09 **ANSWER (a)** 1

SSC Phase-XIV (12th) 16 Sep 2026, Shift-II

Formula: Pure Recurring $0.\overline{a} = \frac{a}{9}$

Once every term is written over 9, the addition becomes easy: $\frac{1+2+3+\ldots+8}{9} = \frac{36}{9} = 4$.

Finally $4 \div 4 = 1$. So the value is **1**.

10 **ANSWER (b)** $\frac{125}{16}$

SSC Phase-XIV (12th) 17 Sep 2026, Shift-II

Concept: Decimal to Fraction Divide the decimal part by a power of 10 and simplify.

$0.8125 = \frac{8125}{10000} = \frac{13}{16}$ (cancelling 625 from top and bottom).

Now $7.8125 = 7 + \frac{13}{16} = \frac{112+13}{16} = \frac{125}{16}$, that is, option (b) $\frac{125}{16}$.

Short Trick Remember, the simplest denominator of a terminating decimal has only 2 and 5. So the options with 14 and 13 are out at once. That leaves $\frac{63}{8}$, but that is 7.875, not 7.8125.

11 **ANSWER (b)** $\frac{78}{33}$

SSC Phase-XIV (12th) 17 Sep 2026, Shift-II

Formula: Recurring Decimal $0.\overline{ab} = \frac{ab}{99}$

$2.\overline{36} = 2 + \frac{36}{99} = 2 + \frac{4}{11} = \frac{26}{11}$.

But $\frac{26}{11}$ is not among the options. Multiply top and bottom by 3 and you get $\frac{78}{33}$, which is option (b) $\frac{78}{33}$.

Examiner's Trap The option is not given in simplest form. If you can't see your answer, don't panic. Look for an equivalent fraction.

12 **ANSWER (b)** Rational and irrational numbers are mutually exclusive.

SSC Phase-XIV (12th) 17 Sep 2026, Shift-II

Rational vs Irrational A rational number can be written in the form $\frac{p}{q}$. An irrational number cannot be written in this form.

The definition itself makes it clear that no number can be both at once. The common part of the two sets is empty, which means they are mutually exclusive.

That is why (C) and (D) are wrong. (A) is also wrong, because these are two different sets that together make up the real numbers. The true statement: **Rational and irrational numbers are mutually exclusive.**

13 **ANSWER (a)** 5/6

SSC Phase-XIV (12th) 18 Sep 2026, Shift-II

Concept: Decimal to Fraction $0.125 = \frac{1}{8}$, $0.\overline{3} = \frac{1}{3}$, $0.75 = \frac{3}{4}$, $0.2 = \frac{1}{5}$

First the numerator: $\frac{1}{8} + \frac{1}{3} = \frac{3+8}{24} = \frac{11}{24}$.

Now the denominator: $\frac{3}{4} - \frac{1}{5} = \frac{15-4}{20} = \frac{11}{20}$.

Both have 11, so it cancels: $\frac{11}{24} \div \frac{11}{20} = \frac{20}{24} = \frac{5}{6}$. So the answer is **5/6**.

14 **ANSWER (b)** 70

SSC Phase-XIV (12th) 18 Sep 2026, Shift-II

Rule: Perfect Square In a perfect square, every prime factor has an even power.

Here the odd powers are 2^3, 5^1 and 7^3. 3^2 is already even, so leave it alone.

To make each odd power even, multiply once each by 2, 5 and 7: $2 \times 5 \times 7 = 70$.

Then $N \times 70 = 2^4 \times 3^2 \times 5^2 \times 7^4$, which is a perfect square. The smallest multiplier is **70**.

Examiner's Trap If you pick 35, the power of 2^3 stays odd. Forgetting the 2 is the most common mistake in the exam.

15 ANSWER (d) I, II and III

SSC Phase-XIV (12th) 18 Sep 2026, Shift-II

Concept: Number Sets $N \subset W \subset Z \subset Q \subset R$ and irrational $\subset R$

I: Any integer n can be written as $\frac{n}{1}$, so it is true.
II: The whole numbers 0, 1, 2, ... are all integers, so this is true too.

III: Real numbers = rational + irrational, so every irrational number is real. This is also true.
All three statements are correct, so the answer is **I, II and III**.

16 ANSWER (a) 16

SSC Phase-XIV (12th) 19 Sep 2026, Shift-II

Rule: Number to Subtract The smallest number to subtract = the remainder left on division.

Let us divide: $23 \times 400 = 9200$, leaving $9400 - 9200 = 200$. Then $23 \times 8 = 184$, leaving $200 - 184 = 16$.

That means $9400 = 23 \times 408 + 16$. Subtract 16 and you get 9384, which is exactly divisible by 23. The number to subtract is **16**.

17 ANSWER (b) $\pi/2$

SSC Phase-XIV (12th) 21 Sep 2026, Shift-II

Concept: Irrational Number A number that cannot be written in the form $\frac{p}{q}$ (p, q integers, $q \neq 0$), such as π, $\sqrt{2}$.

Check each option: $\frac{\sqrt{49}}{2} = \frac{7}{2}$, rational. $2.5 = \frac{5}{2}$, rational. $0.\overline{3} = \frac{1}{3}$, also rational.

π is irrational, and dividing it by a non-zero rational number like 2 keeps it irrational. So the answer is $\pi/2$.

Examiner's Trap Don't assume a number is irrational just because you see a root sign. 49 is a perfect square, $\sqrt{49} = 7$.

18 ANSWER (a) Every natural number is an integer, but every integer is not a natural number.

SSC Phase-XIV (12th) 22 Sep 2026, Shift-II

Concept: Number Sets $N \subset W \subset Z \subset Q$, but this does not hold in the reverse direction.

(A): 1, 2, 3, ... are all integers, but integers like 0, −1, −5 are not natural numbers. The statement is perfectly correct.

One example is enough to prove the rest wrong. (B): −1 is an integer but not a whole number. (C): $\frac{1}{2}$ is rational but not an integer. (D): $\sqrt{2}$ is irrational, not rational.
So the correct option is (a): **Every natural number is an integer, but every integer is not a natural number.**

19 ANSWER (b) 99

SSC Phase-XIV (12th) 22 Sep 2026, Shift-II

Formula: Pure Recurring $0.\overline{ab} = \frac{ab}{99}$, that is, as many 9s in the denominator as there are repeating digits.

Let $x = 0.ababab...$, then $100x = ab.ababab...$.

Subtract the two: $99x = ab$, that is, $x = \frac{ab}{99}$. The denominator will be **99**.

20 ANSWER (d) 33

SSC Phase-XIV (12th) 22 Sep 2026, Shift-II

Rule: Even and Odd Odd + odd = always even.

12 = 1 + 11, 26 = 1 + 25, 50 = 1 + 49. All three are even, so each can be made by adding two odd numbers.

33 is itself odd, and adding two odd numbers never gives an odd number. So the number is **33**.

21 ANSWER (a) 5

SSC Phase-XIV (12th) 23 Sep 2026, Shift-II

Rule: 5 × Odd Multiply 5 by any odd number and the unit digit will still be 5.

Product $= 1 \times 3 \times 5 \times 7 \times ... \times 19$. It contains 5, but not a single even number (factor of 2).

So the product will end in 5, not 0. The unit digit is **5**.

Examiner's Trap Don't write 0 the moment you see 5. A 0 comes only when a factor of 2 is also present.

---

22 ANSWER (c) 14/4

SSC Phase-XIV (12th) 23 Sep 2026, Shift-II

Rational, Not Integer A fraction that does not become a whole number even after simplifying.

$\sqrt{49}=7$, $\frac{-15}{5}=-3$, $\sqrt[3]{-64}=-4$. All three turn out to be integers.

That leaves $\frac{14}{4}=\frac{7}{2}=3.5$, which is rational but not an integer. The correct option is **14/4**.

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23 ANSWER (b) 4

SSC Phase-XIV (12th) 24 Sep 2026, Shift-II

Rule: Least Number to Add Number to be added = next perfect square − given number.

$834^2=695556$ and $835^2=697225$. Our number 697221 lies between these two.

The next perfect square is 697225, so we must add $697225-697221=4$. That is, **4**.

Short Trick Square of a number ending in 5: for 835^2, first do 83 × 84 = 6972, then put 25 after it, giving 697225. The given number is just 4 less than this.

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24 ANSWER (b) 5

SSC Phase-XIV (12th) 24 Sep 2026, Shift-II

Rule: Factor of Divisor If the new divisor is a factor of the old divisor, divide the old remainder by the new divisor. Whatever is left is the new remainder.

Write the number $=36k+17$. 36 is exactly divisible by 12, so $36k$ leaves no remainder.

Now we only have to divide 17 by 12, and the remainder is **5**.

---

25 ANSWER (c) Irrational number

SSC Phase-XIV (12th) 24 Sep 2026, Shift-II

Rule: Rational + Irrational Rational + irrational = always irrational.

−3 is an integer, which means it is also rational. $\sqrt{11}$ is irrational, because 11 is not a perfect square.

Suppose $-3+\sqrt{11}$ were rational. Then $\sqrt{11}$ = (rational) + 3 would also be rational, which is impossible. The student's claim is wrong. It is an **Irrational number**.

---

26 ANSWER (a) 11/13

SSC Phase-XIV (12th) 25 Sep 2026, Shift-II

Terminating or Recurring If the simplest denominator has any prime other than 2 and 5, the decimal will be non-terminating recurring.

$\frac{9}{2}=4.5$ and 0.625 are both terminating. $\sqrt{3}$ is irrational. It is non-terminating, but not recurring.

The denominator of $\frac{11}{13}$ is 13, which is neither 2 nor 5. So $\frac{11}{13}=0.\overline{846153}$, non-terminating recurring. The correct option is **11/13**.

Examiner's Trap $\sqrt{3}$ is also non-terminating, but its digits do not repeat. Don't pick it just after reading 'non-terminating'.

---

27 ANSWER (b) 23/125

SSC Phase-XIV (12th) 25 Sep 2026, Shift-II

Rule: Terminating Decimal If the denominator in simplest form is $=2^m\times5^n$, the decimal terminates.

$45=3^2\times5$, $18=2\times3^2$, $33=3\times11$. All three contain 3 (and 33 also has 11), so they will be recurring.

$125=5^3$ has only 5, so $\frac{23}{125}=0.184$ terminates. Option (b) 23/125 is correct.

---

28 ANSWER (a) 1

SSC Phase-XIV (12th) 26 Sep 2026, Shift-I

Concept: Natural Numbers Natural numbers start from 1, 2, 3, ... 0 and negative numbers are not included.

−2 is negative, 0 is not natural, $\frac{3}{4}$ is a fraction and $\sqrt{15}$ is irrational. All four are out.

Only $\sqrt{16}=4$ is left. There is just one natural number, so the count is **1**.

---

29 **ANSWER (b)** 7/12

SSC Phase-XIV (12th) 26 Sep 2026, Shift-I

Rule: Terminating Decimal If the simplest denominator $=2^m\times5^n$, it terminates. If any other prime is present, it is non-terminating recurring.

$40=2^3\times5$, $125=5^3$, $20=2^2\times5$. All three have only 2 and 5, so these terminate.

$12=2^2\times3$ brings in a 3, and $\frac{7}{12}$ is already in simplest form. So $\frac{7}{12}=0.58\overline{3}$, non-terminating recurring. The answer is **7/12**.

30 **ANSWER (b)** 5

SSC Phase-XIV (Matric) 16 Sep 2026, Shift-III

Concept: Unit Digit An odd power of 9 has unit digit 9, every power of 1 gives 1, and every power of 5 gives 5.

In 149^{123} we look at 9^{123}. 123 is odd, so the unit digit is 9.
151^{111} has unit digit 1, and 155^{55} has 5.

Now multiply: $9\times1\times5=45$, unit digit **5**.

Short Trick Multiply a number ending in 5 by any odd number and the unit digit stays 5. Here the other two terms are both odd, so it is 5 straight away.

31 **ANSWER (b)** 3

SSC Phase-XIV (Matric) 16 Sep 2026, Shift-III

Rule: Divisibility by 8 A number is divisible by 8 only when the number formed by its last three digits is divisible by 8.

The last three digits are 6*2. Try 0, 1, 2 in place of *: 602, 612, 622. None of these is divisible by 8.

Putting * = 3 gives 632 = 8×79 ✓. So the smallest digit is **3**.

32 **ANSWER (b)** Every irrational number is a real number

SSC Phase-XIV (Matric) 17 Sep 2026, Shift-III

Concept: Real Numbers Real numbers = rational ∪ irrational.

(A) is wrong, 0 is a whole number but not a natural number. (C) is wrong, $\sqrt{2}$ is real but not rational. (D) is wrong, −5 is an integer but not a whole number.

That leaves (B). Every irrational number is part of the real numbers, and this is always true: **Every irrational number is a real number**.

33 **ANSWER (b)** Integers ∩ Irrational numbers

SSC Phase-XIV (Matric) 17 Sep 2026, Shift-III

Concept: Intersection (∩) A ∩ B has only those elements that are in both sets. If there is not even one, the set is empty.

(A) has 2, 4, 6, ... (C) has 0, 1, 2, ..., since every whole number is rational. (D) is simply all the irrational numbers. None of these is empty.

Every integer is rational ($n=\frac{n}{1}$), so no integer can ever be irrational. The empty set is **Integers ∩ Irrational numbers**.

34 **ANSWER (b)** $\frac{5}{12}$

SSC Phase-XIV (Matric) 17 Sep 2026, Shift-III

Formula: Mixed Recurring $0.a\overline{bc}=\frac{abc-a}{900}$

Here $0.41666\ldots=0.41\overline{6}=\frac{416-41}{900}=\frac{375}{900}$.

Cancel 75 from top and bottom: $\frac{375}{900}=\frac{5}{12}$. The simplest fraction is $\frac{5}{12}$.

Short Trick In the exam you can also check from the options: $\frac{5}{12}=0.41666\ldots$ ✓, while $\frac{6}{18}=0.333\ldots$ and $\frac{7}{15}=0.4666\ldots$.

35 **ANSWER (a)** 8

SSC Phase-XIV (Matric) 18 Sep 2026, Shift-III

Concept: Least Addition Smallest number to be added = Divisor − Remainder

First find the remainder. $37\times116=4292$, so $4321-4292=29$ is left over.

To complete 37, we need 37 − 29 = 8 more. Check it: 4321 + 8 = 4329 = 37×117.
So the answer is **8**.

Examiner's Trap 29 is the remainder, which means it has to be **subtracted**. When you need to add, always

take 37 − 29.

36 **ANSWER (a)** $\frac{7}{8}$

SSC Phase-XIV (Matric) 18 Sep 2026, Shift-III

$0.875 = \frac{875}{1000}$. Cancel both the numerator and the denominator by 125 and you get $\frac{7}{8}$ straight away.

Short Trick Remember $\frac{1}{8} = 0.125$. Then $\frac{7}{8} = 7 \times 0.125 = 0.875$, with no calculation at all.

37 **ANSWER (c)** $\frac{1}{25}$

SSC Phase-XIV (Matric) 18 Sep 2026, Shift-III

$0.04 = \frac{4}{100}$. Now simplify by 4 and $\frac{1}{25}$ remains. The answer is $\frac{1}{25}$.

Examiner's Trap $\frac{1}{20} = 0.05$, not 0.04. The two are so close that this is exactly where students slip in a hurry.

38 **ANSWER (b)** Whole numbers

SSC Phase-XIV (Matric) 19 Sep 2026, Shift-III

Concept: Number Sets Whole numbers W = {0, 1, 2, 3, ...}

Check each option. Natural numbers start from 1, so 0 is not in them at all. Integers contain both 0 and −1. Irrational numbers contain neither, because 0 and −1 are both rational.

That leaves whole numbers, which contain 0 but no negative number. The correct option is **Whole numbers**.

39 **ANSWER (b)** 0

SSC Phase-XIV (Matric) 19 Sep 2026, Shift-III

Concept: W and N W = N ∪ {0}, which means the only difference between the two is 0

Whole numbers run 0, 1, 2, ... and natural numbers run 1, 2, 3, ... Only one number is whole but not natural: **0**. (−1 is not even a whole number.)

40 **ANSWER (c)** $5\frac{1}{8}$

SSC Phase-XIV (Matric) 19 Sep 2026, Shift-III

Break 5.125 up: 5 + 0.125. And $0.125 = \frac{125}{1000} = \frac{1}{8}$.

So $5.125 = 5\frac{1}{8}$. The answer is $5\frac{1}{8}$.

Short Trick The integer part is 5, and only option (c) has 5. No calculation needed.

41 **ANSWER (d)** 0

SSC Phase-XIV (Matric) 21 Sep 2026, Shift-III

Concept: Unit Digit Take any power of 5 or 6 and the unit digit stays the same. The cycle of 3 is 3, 9, 7, 1 (length 4)

The unit digit of $(25)^{6251}$ is 5 and that of $(36)^{528}$ is 6. No thinking needed here.

For $(73)^{54}$, divide 54 by 4. The remainder is 2. So $3^2 = 9$, and the unit digit is 9.

Now add the three unit digits: 5 + 6 + 9 = 20. The unit digit is **0**.

42 **ANSWER (b)** 1

SSC Phase-XIV (Matric) 22 Sep 2026, Shift-III

Rule: Divisibility by 11 (Sum of digits at odd places) − (Sum of digits at even places) = 0 or a multiple of 11

The digits are 4, 8, 3, 2, 7, *, 8. At odd places (1, 3, 5, 7): 4 + 3 + 7 + 8 = 22.
At even places (2, 4, 6): 8 + 2 + * = 10 + *.

Difference = 22 − (10 + *) = 12 − *. We need this to be 11, so * must be 1.
The smallest number is **1**.

43 **ANSWER (a)** 0.47

SSC Phase-XIV (Matric) 22 Sep 2026, Shift-III

Convert all of them to decimals: $\frac{9}{20} = 0.45$, $\frac{11}{25} = 0.44$, $\frac{7}{16} = 0.4375$.

Now the comparison is easy: 0.47 > 0.45 > 0.44 > 0.4375. The largest is **0.47**.

Short Trick Make the denominator 100 for the fractions with denominators 20 and 25: $\frac{45}{100}$ and $\frac{44}{100}$. Both are clearly smaller than 0.47.

44 **ANSWER (a)** Natural numbers ⊂ Whole numbers ⊂ Integers ⊂ Rational numbers ⊂ Real numbers

SSC Phase-XIV (Matric) 23 Sep 2026, Shift-III

Concept: Number Hierarchy $\mathbb{N} \subset \mathbb{W} \subset \mathbb{Z} \subset \mathbb{Q} \subset \mathbb{R}$ (each next set contains the previous one)

Think about how the sets grow. Add 0 to the natural numbers and you get the whole numbers. Add the negative numbers to these and you get the integers. Every integer is rational, and every rational number is real.

(b) puts the real numbers inside the rational numbers, and in (c) and (d) the order is jumbled. All three are wrong.
So option (a) **Natural numbers ⊂ Whole numbers ⊂ Integers ⊂ Rational numbers ⊂ Real numbers** is correct.

45 ANSWER (c) $\sqrt{15}$

SSC Phase-XIV (Matric) 23 Sep 2026, Shift-III

Concept: Irrational Number A real number that cannot be written in the form $\frac{p}{q}$ is irrational

11 and −8 are integers, and $0.625 = \frac{5}{8}$. All three turn out to be rational.

15 is not a perfect square, so $\sqrt{15}$ is irrational, but it is still real.

46 ANSWER (b) 47

SSC Phase-XIV (Matric) 24 Sep 2026, Shift-III

Concept: Least Addition Number to be added = Divisor − Remainder

$119 \times 105 = 12495$, so remainder = 12567 − 12495 = 72.

Now we must add 119 − 72 = 47. Check: 12614 = 119×106. So the answer is **47**.

Examiner's Trap 72 is placed in the options on purpose. It is the remainder, which you subtract, not add.

47 ANSWER (a) 4

SSC Phase-XIV (Matric) 24 Sep 2026, Shift-III

Concept: Unit Digit Cycle Cycle of 8: 8, 4, 2, 6. A power of 4 ends in 4 when the power is odd and in 6 when it is even

$(348)^{124}$: divide 124 by 4 and the remainder is 0, which means the fourth term of the cycle, 6.

$(244)^{125}$: the power is odd, so the unit digit is 4.

$6 \times 4 = 24$, unit digit **4**.

48 ANSWER (a) $\frac{11}{40}$

SSC Phase-XIV (Matric) 24 Sep 2026, Shift-III

Rule: Terminating Decimal A decimal terminates only when the denominator, in simplest form, is just $2^m \times 5^n$

In $\frac{11}{40}$, $40 = 2^3 \times 5$, so only 2s and 5s. It terminates (= 0.275).

Look at the rest. $\frac{24}{17}$ has 17 as the denominator. The denominator of $\frac{7}{60}$ still has a 3 in it. $\frac{45}{1030490} = \frac{9}{206098}$ and $206098 = 2 \times 103049$, and 103049 has nothing to do with 2 or 5. All three are non-terminating. The correct option is $\frac{11}{40}$.

Examiner's Trap Always bring the fraction to its simplest form before checking the denominator. If the numerator cancels a factor of the denominator, the verdict can change.

49 ANSWER (a) 60

SSC Phase-XIV (Matric) 25 Sep 2026, Shift-III

$97 \times 79 = 7663$, so when 7700 is divided by 97, the remainder = 7700 − 7663 = 37.

We need to add 97 − 37 = 60. Check: $7760 = 97 \times 80$. Answer **60**.

Short Trick Think of the next multiple directly: $97 \times 80 = 7760$. Now 7760 − 7700 = 60, and you are done.

50 ANSWER (d) 9

SSC Phase-XIV (Matric) 25 Sep 2026, Shift-III

Concept: Unit Digit Cycle The cycle of 3 is 3, 9, 7, 1 and the cycle of 7 is 7, 9, 3, 1 (both of length 4)

$(2153)^{167}$: divide 167 by 4, remainder 3. So $3^3 = 27$, unit digit 7.

$(8267)^{153}$: divide 153 by 4, remainder 1. Unit digit 7.

$7 \times 7 = 49$, so the unit digit is **9**.

02 CHAPTER
Simplification & Approximation

Questions *54 questions · 22 shifts*

Simplification & Approximation

Directions (Q. 01–54): *Choose the correct answer from the four given options.*

01 What is the value of $(\sqrt{5}+\sqrt{2})(\sqrt{5}-\sqrt{2})$?

SSC Phase-XIV (Graduation) 18 Sep 2026, Shift-I

(a) 3 (b) 7 (c) $\sqrt{3}$ (d) 5

02 Simplify: $(8^2-6^2)/(8-6)$

SSC Phase-XIV (Graduation) 18 Sep 2026, Shift-I

(a) 2 (b) 14 (c) 7 (d) 13

03 Simplify: $(\sqrt{50}-\sqrt{8})$

SSC Phase-XIV (Graduation) 21 Sep 2026, Shift-I

(a) $20\sqrt{2}$ (b) $3\sqrt{2}$ (c) $10\sqrt{2}$ (d) $200\sqrt{2}$

04 A number is written as 3.272727 . . . (recurring). Express it as a fraction.

SSC Phase-XIV (Graduation) 21 Sep 2026, Shift-I

(a) $\frac{327}{99}$ (b) $\frac{324}{99}$ (c) $\frac{298}{91}$ (d) $\frac{333}{99}$

05 Find the value of the surd expression $\sqrt{75}-\sqrt{27}$.

SSC Phase-XIV (Graduation) 21 Sep 2026, Shift-I

(a) $2\sqrt{3}$ (b) $3\sqrt{2}$ (c) $4\sqrt{3}$ (d) $6\sqrt{2}$

06 Simplify: $1.25+2.5\times(1.6-0.4)\div0.2$

SSC Phase-XIV (Graduation) 23 Sep 2026, Shift-I

(a) 19.25 (b) 16.25 (c) 15.5 (d) 14

07 Find the value of: $(11^2+14^2)\div3$

SSC Phase-XIV (Graduation) 25 Sep 2026, Shift-I

(a) 107.67 (b) 104.17 (c) 110.67 (d) 105.67

08 Find the value of: $\frac{0.125+0.008}{0.25-0.10+0.04}+\frac{0.064-0.027}{0.16+0.12+0.09}$

SSC Phase-XIV (Graduation) 25 Sep 2026, Shift-I

(a) 0.4 (b) 0.8 (c) 0.6 (d) 0.2

09 If $(48\div36\times3)-[15\div9\times(40-31)-10]+2P=8\div4$, then find the value of P.

SSC Phase-XIV (12th) 16 Sep 2026, Shift-II

(a) $\frac{5}{2}$ (b) $\frac{2}{3}$ (c) $\frac{3}{2}$ (d) $\frac{7}{2}$

10 Simplify the expression: $\frac{\sqrt{10+\sqrt{24}+\sqrt{40}+\sqrt{60}}}{\sqrt{2}+\sqrt{3}+\sqrt{5}}$.

SSC Phase-XIV (12th) 16 Sep 2026, Shift-II

(a) $\sqrt{5}$ (b) 1 (c) 2 (d) $\sqrt{7}$

11 Which of the following is equal to $\sqrt{5}-\sqrt{2}$?

SSC Phase-XIV (12th) 17 Sep 2026, Shift-II

(a) $\sqrt{5}+\sqrt{2}$ (b) $\sqrt{5}-\sqrt{2}+1$
(c) $(\sqrt{5}-\sqrt{2})/1$ (d) None of these

12 Simplify: $[(0.64\div0.008)-18.75\%\text{ of }320]\div[5^2-(4^3\div8)]$

SSC Phase-XIV (12th) 17 Sep 2026, Shift-II

(a) $\frac{20}{17}$ (b) $\frac{17}{20}$ (c) $\frac{21}{17}$ (d) $\frac{19}{17}$

13 Simplify: $[(\frac{13}{15}\div\frac{26}{45})+(\frac{7}{12}\div\frac{14}{9})]\times\frac{48}{7}$

SSC Phase-XIV (12th) 18 Sep 2026, Shift-II

(a) 70 (b) 60 (c) $\frac{90}{7}$ (d) 90

14 If the value of $[(6^{12})^{\frac{1}{3}}\times\sqrt[3]{27}\div3^2]+4^0-1000^0$ is

equal to $2^a \times 3^b \times 5^c$, then what is the value of $a+b-2c$?

SSC Phase-XIV (12th) 18 Sep 2026, Shift-II

(a) 7 (b) 12 (c) 18 (d) 22

15 Calculate: $\sqrt{0.\overline{4} \times (0.4\overline{6} + 0.03)}$.

SSC Phase-XIV (12th) 19 Sep 2026, Shift-II

(a) $\frac{1}{5}$ (b) $\frac{1}{7}$ (c) $\sqrt{\frac{149}{675}}$ (d) $\frac{1}{2}$

16 Find the value of: $\frac{(2.3)^3 - 0.027}{(2.3)^2 + 0.69 + 0.09}$.

SSC Phase-XIV (12th) 19 Sep 2026, Shift-II

(a) 2 (b) 7 (c) 1 (d) 9

17 What is the value of $3^2 + 5 \times 2 - 4$?

SSC Phase-XIV (12th) 21 Sep 2026, Shift-II

(a) 15 (b) 17 (c) 19 (d) 13

18 Simplify the expression:
$(6.38 \times 56 + 6.38 \times 44) \div [(8.19)^2 - (1.81)^2]$

SSC Phase-XIV (12th) 21 Sep 2026, Shift-II

(a) 8 (b) 9 (c) 10 (d) 11

19 Simplify: $1 + \frac{3}{4}$

SSC Phase-XIV (12th) 22 Sep 2026, Shift-II

(a) 7/8 (b) 7 (c) 5/7 (d) 7/4

20 Simplify:
$\left[\left(\frac{3}{5} + \frac{2}{3}\right) \times \frac{15}{8}\right] - \left[\frac{7}{6} \div \frac{14}{9} + \frac{1}{2}\right]$

SSC Phase-XIV (12th) 22 Sep 2026, Shift-II

(a) 2/11 (b) 7/6 (c) 9/8 (d) 1/3

21 Simplify: $\sqrt{9 + 4\sqrt{5}} + \sqrt{9 - 4\sqrt{5}}$.

SSC Phase-XIV (12th) 23 Sep 2026, Shift-II

(a) $\sqrt{5}$ (b) $2\sqrt{5}$ (c) $4\sqrt{5}$ (d) $5\sqrt{2}$

22 Simplify:
$\left(\sqrt{2025} + \sqrt[3]{1728}\right) \times \left(\frac{8}{19}\right) - (2^5 - 3^3)$.

SSC Phase-XIV (12th) 23 Sep 2026, Shift-II

(a) 19 (b) 18 (c) 24 (d) 21

23 Find the value of: $\left(\frac{\sqrt{324}}{\sqrt{81}} + \frac{\sqrt{196}}{\sqrt{49}}\right) \div \left(\sqrt{16} - \frac{\sqrt{25}}{\sqrt{5}}\right)$

SSC Phase-XIV (12th) 23 Sep 2026, Shift-II

(a) $\frac{(12+2\sqrt{3})}{11}$ (b) $\frac{(12+2\sqrt{3})}{7}$ (c) $\frac{(16+4\sqrt{3})}{7}$ (d) $\frac{(16+4\sqrt{5})}{11}$

24 Find the value of the expression:
$(0.3 + 0.6) \div (0.12 \times 7.5)$.

SSC Phase-XIV (12th) 25 Sep 2026, Shift-II

(a) 1 (b) 3 (c) 7 (d) 4

25 What approximate value should come in place of the question mark (?)?
$50.012 \times 15.68 - 30.013 \times 1.000 = (20 + ?) \times 5.23$

SSC Phase-XIV (12th) 25 Sep 2026, Shift-II

(a) 124.20 (b) 193.05 (c) 154.35 (d) 200.05

26 What is the result of $(10 + 2) \times (6 - 4) \div 2$?

SSC Phase-XIV (12th) 26 Sep 2026, Shift-I

(a) 6 (b) 12 (c) 10 (d) 8

27 Simplify using BODMAS:
$(224 \div 14) + 16 \times 7 - 5$

SSC Phase-XIV (Matric) 16 Sep 2026, Shift-III

(a) 123 (b) 34 (c) 219 (d) 48

28 Simplify using BODMAS:
$[(72 \div 12) + (22 - 15)] \times 2 - 19 + 23$

SSC Phase-XIV (Matric) 16 Sep 2026, Shift-III

(a) 68 (b) -16 (c) -198 (d) 30

29 A number is increased by $\frac{3}{4}$ and it becomes 2.35. What is the original number?

SSC Phase-XIV (Matric) 16 Sep 2026, Shift-III

(a) 1.5 (b) 1.55 (c) 1.6 (d) 1.65

30 Convert the mixed fraction $7\frac{3}{8}$ into decimal form. Which of the following is correct?

SSC Phase-XIV (Matric) 16 Sep 2026, Shift-III

(a) 7.3 (b) 7.375 (c) 7.308 (d) 7.475

31 Simplify: $18 - [5 - \{6 + 2(7 - \overline{8 - 5})\}]$.

SSC Phase-XIV (Matric) 17 Sep 2026, Shift-III

(a) 15 (b) 27 (c) 18 (d) 32

32 Simplify using BODMAS:
$[(60 \div 12) + (19 - 12)] \times 2 - 16 + 20$

SSC Phase-XIV (Matric) 17 Sep 2026, Shift-III

(a) 28 (b) -12 (c) -148 (d) 60

33 Solve the following expression and write your

final answer as a simplified mixed fraction:
$\left(4.875-2\frac{5}{8}\right)\div 0.175$

SSC Phase-XIV (Matric) 17 Sep 2026, Shift-III

(a) $13\frac{3}{4}$ (b) $11\frac{1}{2}$ (c) $12\frac{3}{4}$ (d) $12\frac{6}{7}$

34 Simplify using BODMAS:
$[90\div 10+(15-7)]\times 10-6$

SSC Phase-XIV (Matric) 18 Sep 2026, Shift-III

(a) 164 (b) 83 (c) 176 (d) 68

35 Simplify using BODMAS:
$[(64\div 8)+(21-14)]\times 2-18+22$

SSC Phase-XIV (Matric) 18 Sep 2026, Shift-III

(a) -218 (b) -10 (c) 70 (d) 34

36 Simplify:
$24+[32\div(2\times 4)\times\{15-(6+9)\div 3\}]$.

SSC Phase-XIV (Matric) 19 Sep 2026, Shift-III

(a) 54 (b) 64 (c) 78 (d) 86

37 Simplify: 0.4 of $[0.25+\{0.5\times(1.2+1.8\div 0.6)\}]$.

SSC Phase-XIV (Matric) 19 Sep 2026, Shift-III

(a) 0.86 (b) 0.94 (c) 0.75 (d) 0.12

38 Which fraction should be added to the sum of 0.125 and 0.375 so that the result is exactly $1\frac{7}{10}$?

SSC Phase-XIV (Matric) 19 Sep 2026, Shift-III

(a) $\frac{6}{3}$ (b) $\frac{8}{6}$ (c) $\frac{5}{7}$ (d) $\frac{6}{5}$

39 Simplify using BODMAS:
$[96\div 12+(16-8)]\times 11-7$

SSC Phase-XIV (Matric) 21 Sep 2026, Shift-III

(a) 182 (b) 64 (c) 169 (d) 89

40 Simplify using BODMAS:
$[(63\div 9)+(20-13)]\times 2-17+21$

SSC Phase-XIV (Matric) 21 Sep 2026, Shift-III

(a) -189 (b) 32 (c) 66 (d) -10

41 What is the value of $4\frac{1}{2}\div\frac{3}{5}$?

SSC Phase-XIV (Matric) 21 Sep 2026, Shift-III

(a) $6\frac{1}{2}$ (b) $7\frac{1}{2}$ (c) 8 (d) $8\frac{1}{2}$

42 Simplify using BODMAS:
$22^2-3^2+\sqrt{576}-(20+21)$

SSC Phase-XIV (Matric) 22 Sep 2026, Shift-III

(a) 344 (b) 540 (c) 410 (d) 458

43 Simplify using BODMAS:
$[(80\div 10)+(23-16)]\times 2-20+24$

SSC Phase-XIV (Matric) 22 Sep 2026, Shift-III

(a) -14 (b) 74 (c) 34 (d) -246

44 Find the value of: $\frac{\sqrt{1600}+\sqrt{900}}{\sqrt{100}}$

SSC Phase-XIV (Matric) 22 Sep 2026, Shift-III

(a) 5 (b) 6 (c) 7 (d) 8

45 Find the value of: $\frac{3}{8}+0.125+1\frac{1}{2}$.

SSC Phase-XIV (Matric) 22 Sep 2026, Shift-III

(a) 1.875 (b) 2 (c) 2.125 (d) 2.25

46 Simplify:
$5\frac{1}{2}-\left[2\frac{1}{3}\div\left\{1\frac{3}{4}-\frac{1}{2}\left(1\frac{1}{2}-\frac{1}{3}-\frac{1}{6}\right)\right\}\right]$.

SSC Phase-XIV (Matric) 23 Sep 2026, Shift-III

(a) $\frac{5}{4}$ (b) $\frac{107}{8}$ (c) $\frac{109}{30}$ (d) $\frac{7}{8}$

47 Simplify:
$4.5-[2.8\div\{0.7+0.1\times(1.5-0.2-0.3)\}]$.

SSC Phase-XIV (Matric) 23 Sep 2026, Shift-III

(a) 0 (b) 1 (c) 2 (d) 6

48 A student has a piece of ribbon 0.4 m long. He buys another piece of ribbon half $\left(\frac{1}{2}\right)$ a metre long. What is the total length of ribbon he has now? (Express your final answer as a decimal.)

SSC Phase-XIV (Matric) 23 Sep 2026, Shift-III

(a) 0.2 m (b) 0.9 m (c) 1.1 m (d) 0.1 m

49 Simplify using BODMAS:
$[18\div 6+(4-3)]\times 5-2$

SSC Phase-XIV (Matric) 24 Sep 2026, Shift-III

(a) 12 (b) 22 (c) 6 (d) 18

50 Simplify using BODMAS:
$[(18\div 3)+(4-2)]\times 2-5+6$

SSC Phase-XIV (Matric) 24 Sep 2026, Shift-III

(a) -18 (b) 17 (c) 5 (d) 27

51 Simplify using BODMAS:
$21^2-4^2+\sqrt{529}-(19+20)$

SSC Phase-XIV (Matric) 25 Sep 2026, Shift-III

(a) 287 (b) 273 (c) 409 (d) 363

52 Simplify using BODMAS:
$[(20 \div 4) + (6 - 5)] \times 2 - 3 + 7$

SSC Phase-XIV (Matric) 25 Sep 2026, Shift-III

(a) 16 (b) 1 (c) 22 (d) 2

53 Find the value of $\left(2\frac{1}{3} - 1\frac{5}{6}\right) \div \frac{1}{4}$.

SSC Phase-XIV (Matric) 25 Sep 2026, Shift-III

(a) 1 (b) $1\frac{1}{2}$ (c) 2 (d) $2\frac{1}{2}$

54 A water container holds 8.4 litres of liquid. A cook uses $2\frac{3}{5}$ litres for a dish and then spills 0.45 litre. How many litres of water are left in the container?

SSC Phase-XIV (Matric) 25 Sep 2026, Shift-III

(a) 4.28 litres (b) 5.35 litres
(c) 3.33 litres (d) 6.34 litres

Answer Key *SSC official key*

Simplification & Approximation (Q. 01–54)

01	(a)	02	(b)	03	(b)	04	(b)	05	(a)	06	(b)	07	(d)	08	(b)	09	(c)	10	(b)
11	(c)	12	(a)	13	(c)	14	(a)	15	(c)	16	(a)	17	(a)	18	(c)	19	(d)	20	(c)
21	(b)	22	(a)	23	(d)	24	(a)	25	(a)	26	(b)	27	(a)	28	(d)	29	(c)	30	(b)
31	(b)	32	(a)	33	(d)	34	(a)	35	(d)	36	(b)	37	(b)	38	(d)	39	(c)	40	(b)
41	(b)	42	(d)	43	(c)	44	(c)	45	(b)	46	(c)	47	(b)	48	(b)	49	(d)	50	(b)
51	(c)	52	(a)	53	(c)	54	(b)												

Detailed Explanations रटना बंद, समझना शुरू

Simplification & Approximation

01 **ANSWER (a)** 3

SSC Phase-XIV (Graduation) 18 Sep 2026, Shift-I

Formula: Diff. of Squares $(a+b)(a-b) = a^2 - b^2$

Here a = √5, b = √2. So $(\sqrt{5})^2 - (\sqrt{2})^2 = 5 - 2 = 3$, and the answer is **3**.

Examiner's Trap $\sqrt{5} - \sqrt{2} \neq \sqrt{3}$. Surds cannot be subtracted directly like this, so the $\sqrt{3}$ option is a trap.

02 **ANSWER (b)** 14

SSC Phase-XIV (Graduation) 18 Sep 2026, Shift-I

Formula: Diff. of Squares $\frac{a^2 - b^2}{a - b} = a + b$

$\frac{(8-6)(8+6)}{8-6} = 8 + 6 = 14$. You can also do it directly if you like: $\frac{64-36}{2} = \frac{28}{2} = 14$. Either way, it comes to **14**.

03 **ANSWER (b)** $3\sqrt{2}$

SSC Phase-XIV (Graduation) 21 Sep 2026, Shift-I

Concept: Simplifying Surds $\sqrt{a^2 b} = a\sqrt{b}$

Take the perfect square out of both.
$\sqrt{50} = \sqrt{25 \times 2} = 5\sqrt{2}$ and $\sqrt{8} = \sqrt{4 \times 2} = 2\sqrt{2}$.
Now both are like terms: $5\sqrt{2} - 2\sqrt{2} = 3\sqrt{2}$, which gives $3\sqrt{2}$.

04 **ANSWER (b)** $\frac{324}{99}$

SSC Phase-XIV (Graduation) 21 Sep 2026, Shift-I

Rule: Pure Recurring Decimal $0.\overline{ab} = \frac{ab}{99}$

$3.\overline{27} = 3 + \frac{27}{99} = \frac{297+27}{99} = \frac{324}{99}$ (simplified, it is $\frac{36}{11}$). The option gives $\frac{324}{99}$, and that is the correct one.

Short Trick Subtract the non-recurring part from the whole number and divide by 99: $\frac{327-3}{99} = \frac{324}{99}$.

Examiner's Trap Writing $\frac{327}{99}$ is wrong, because that

becomes $3.\overline{30}$. Do not forget to subtract the non-recurring 3.

05 **ANSWER (a)** $2\sqrt{3}$

SSC Phase-XIV (Graduation) 21 Sep 2026, Shift-I

Separate out the perfect squares:
$\sqrt{75} = \sqrt{25\times3} = 5\sqrt{3}$ and $\sqrt{27} = \sqrt{9\times3} = 3\sqrt{3}$.
Then $5\sqrt{3} - 3\sqrt{3} = 2\sqrt{3}$. So the answer is $2\sqrt{3}$.

06 **ANSWER (b)** 16.25

SSC Phase-XIV (Graduation) 23 Sep 2026, Shift-I

Rule: BODMAS Brackets first, then division/multiplication (left to right), and addition/subtraction at the end

Bracket: 1.6 − 0.4 = 1.2.

Now move from left to right: $2.5\times1.2 = 3$, then $3\div0.2 = 15$.

Finally, 1.25 + 15 = **16.25**.

07 **ANSWER (d)** 105.67

SSC Phase-XIV (Graduation) 25 Sep 2026, Shift-I

$11^2 = 121$ and $14^2 = 196$, which add up to 317.

$317\div3 = 105.666\ldots \approx 105.67$, which is **105.67**.

08 **ANSWER (b)** 0.8

SSC Phase-XIV (Graduation) 25 Sep 2026, Shift-I

Formula: Sum/Diff. of Cubes $\frac{a^3+b^3}{a^2-ab+b^2} = a+b$ and $\frac{a^3-b^3}{a^2+ab+b^2} = a-b$

Do not panic at the decimals. These are direct formula questions. First fraction: take $a=0.5$, $b=0.2$ ($0.5^3=0.125$, $0.2^3=0.008$, $ab=0.10$). Value = 0.5 + 0.2 = 0.7.

Second fraction: $a=0.4$, $b=0.3$ ($0.4^3=0.064$, $0.3^3=0.027$, $ab=0.12$). Value = 0.4 − 0.3 = 0.1.

Add the two: 0.7 + 0.1 = **0.8**.

09 **ANSWER (c)** $\frac{3}{2}$

SSC Phase-XIV (12th) 16 Sep 2026, Shift-II

Rule: BODMAS Division and multiplication always go in order from left to right

First bracket: $48\div36 = \frac{4}{3}$, then $\frac{4}{3}\times3 = 4$.

Second bracket: 40 − 31 = 9. Now $15\div9 = \frac{5}{3}$ and $\frac{5}{3}\times9 = 15$. Then 15 − 10 = 5.

The equation becomes 4 − 5 + 2P = 2. So 2P = 3 and $P = \frac{3}{2}$.

Examiner's Trap Do not turn $48\div36\times3$ into $48\div108$. Division and multiplication must go from left to right.

10 **ANSWER (b)** 1

SSC Phase-XIV (12th) 16 Sep 2026, Shift-II

Formula: Square of 3 Terms
$(a+b+c)^2 = a^2+b^2+c^2+2ab+2bc+2ca$

First open up the surds inside: $\sqrt{24} = 2\sqrt{6}$, $\sqrt{40} = 2\sqrt{10}$, $\sqrt{60} = 2\sqrt{15}$. So inside the root we have $10+2\sqrt{6}+2\sqrt{10}+2\sqrt{15}$.

Now expand
$(\sqrt{2}+\sqrt{3}+\sqrt{5})^2 = 2+3+5+2\sqrt{6}+2\sqrt{15}+2\sqrt{10}$ and see. It is exactly the same expression.

This means the numerator = $\sqrt{2}+\sqrt{3}+\sqrt{5}$, which equals the denominator. The value is **1**.

Short Trick The moment you spot 10 = 2 + 3 + 5 inside, you know the numerator is just the square root of the denominator's square. Answer 1.

11 **ANSWER (c)** $(\sqrt{5}-\sqrt{2})/1$

SSC Phase-XIV (12th) 17 Sep 2026, Shift-II

Divide any number by 1 and it stays the same. So $(\sqrt{5}-\sqrt{2})/1 = \sqrt{5}-\sqrt{2}$.

In (a) the sign has changed and in (b) an extra 1 has been added, so neither is equal.
That makes option (c) $(\sqrt{5}-\sqrt{2})/1$ correct.

12 **ANSWER (a)** $\frac{20}{17}$

SSC Phase-XIV (12th) 17 Sep 2026, Shift-II

Concept: % to Fraction $18.75\% = \frac{3}{16}$

$0.64\div0.008 = \frac{640}{8} = 80$. 18.75% of 320 = $320\times\frac{3}{16} = 60$. First bracket = 80 − 60 = 20.

Second bracket: $4^3\div8 = 64\div8 = 8$, then $5^2 - 8 = 25 - 8 = 17$.

So the value = $\frac{20}{17}$.

13 **ANSWER (c)** $\frac{90}{7}$

SSC Phase-XIV (12th) 18 Sep 2026, Shift-II

Turn the division into multiplication by the reciprocal: $\frac{13}{15} \div \frac{26}{45} = \frac{13}{15} \times \frac{45}{26} = \frac{3}{2}$.

Similarly, $\frac{7}{12} \div \frac{14}{9} = \frac{7}{12} \times \frac{9}{14} = \frac{3}{8}$.

Their sum is $\frac{3}{2} + \frac{3}{8} = \frac{15}{8}$. Now $\frac{15}{8} \times \frac{48}{7} = \frac{90}{7}$, which gives $\frac{90}{7}$.

14 **ANSWER (a)** 7

SSC Phase-XIV (12th) 18 Sep 2026, Shift-II

Rule: Exponents $(x^m)^n = x^{mn}$, $x^0 = 1$

$(6^{12})^{\frac{1}{3}} = 6^4 = 2^4 \times 3^4$ and $\sqrt[3]{27} = 3$. So the bracket = $2^4 \times 3^4 \times 3 \div 3^2 = 2^4 \times 3^3 = 432$.

$4^0 - 1000^0 = 1 - 1 = 0$, so this part cancels out. The full value is $432 = 2^4 \times 3^3 \times 5^0$.

That is, a = 4, b = 3, c = 0. Now $a + b - 2c = 4 + 3 - 0 = 7$, so the answer is **7**.

Examiner's Trap There is no 5 in 432 at all, so take c = 0. If you assume c = 1, the answer will come out wrong.

15 **ANSWER (c)** $\sqrt{\frac{149}{675}}$

SSC Phase-XIV (12th) 19 Sep 2026, Shift-II

Rule: Recurring Decimals $0.\overline{a} = \frac{a}{9}$, $0.\overline{ab} = \frac{ab - a}{90}$

$0.\overline{4} = \frac{4}{9}$ and $0.4\overline{6} = \frac{46 - 4}{90} = \frac{42}{90} = \frac{7}{15}$.

Now add 0.03: $\frac{7}{15} + \frac{3}{100} = \frac{140 + 9}{300} = \frac{149}{300}$.

Product = $\frac{4}{9} \times \frac{149}{300} = \frac{149}{675}$. Its square root is the answer: $\sqrt{\frac{149}{675}}$.

16 **ANSWER (a)** 2

SSC Phase-XIV (12th) 19 Sep 2026, Shift-II

Formula: Diff. of Cubes $\frac{a^3 - b^3}{a^2 + ab + b^2} = a - b$

Take a = 2.3 and b = 0.3. $b^3 = 0.027$, $ab = 0.69$, $b^2 = 0.09$, so the expression is exactly in the formula's form.

So the value = a − b = 2.3 − 0.3 = **2**.

17 **ANSWER (a)** 15

SSC Phase-XIV (12th) 21 Sep 2026, Shift-II

Rule: BODMAS Powers first, then multiplication, then addition/subtraction

$3^2 = 9$ and $5 \times 2 = 10$. Now 9 + 10 − 4 = 15. The correct option is **15**.

18 **ANSWER (c)** 10

SSC Phase-XIV (12th) 21 Sep 2026, Shift-II

Formula: Common, $a^2 - b^2$ $ab + ac = a(b + c)$, $a^2 - b^2 = (a - b)(a + b)$

6.38 is common in the numerator: $6.38 \times (56 + 44) = 6.38 \times 100 = 638$.

The denominator is a difference of squares: $(8.19 - 1.81)(8.19 + 1.81) = 6.38 \times 10 = 63.8$.

$\frac{638}{63.8} = 10$. See how 6.38 was planted in both places so that everything cancels. Answer **10**.

19 **ANSWER (d)** 7/4

SSC Phase-XIV (12th) 22 Sep 2026, Shift-II

Concept: Integer + Fraction Write the whole number as a fraction with the same denominator: $1 = \frac{4}{4}$

Now just add: $1 + \frac{3}{4} = \frac{4}{4} + \frac{3}{4} = \frac{7}{4}$, which is **7/4**.

20 **ANSWER (c)** 9/8

SSC Phase-XIV (12th) 22 Sep 2026, Shift-II

Rule: BODMAS Brackets first, then Of, then division, multiplication, addition and subtraction. Division and multiplication go left to right among themselves, and so do addition and subtraction.

First bracket: $\frac{3}{5} + \frac{2}{3} = \frac{9 + 10}{15} = \frac{19}{15}$. Multiply it by $\frac{15}{8}$ and the 15 cancels: $\frac{19}{15} \times \frac{15}{8} = \frac{19}{8}$

In the second bracket, division comes first: $\frac{7}{6} \div \frac{14}{9} = \frac{7}{6} \times \frac{9}{14} = \frac{3}{4}$. Then $\frac{3}{4} + \frac{1}{2} = \frac{5}{4}$

Now subtract: $\frac{19}{8} - \frac{5}{4} = \frac{19 - 10}{8} = \frac{9}{8}$

So the answer is **9/8**.

Examiner's Trap Adding $\frac{14}{9} + \frac{1}{2}$ first in the second bracket is the mistake most students make. In

BODMAS, division comes first.

21 **ANSWER (b)** $2\sqrt{5}$

SSC Phase-XIV (12th) 23 Sep 2026, Shift-II

Formula: (a+b)² $(\sqrt{x}+\sqrt{y})^2 = x+y+2\sqrt{xy}$

Let $p = \sqrt{9+4\sqrt{5}} + \sqrt{9-4\sqrt{5}}$. Square both sides:

$p^2 = (9+4\sqrt{5}) + (9-4\sqrt{5}) + 2\sqrt{(9+4\sqrt{5})(9-4\sqrt{5})}$
$= 18 + 2\sqrt{81-80} = 18+2 = 20$

So $p = \sqrt{20} = 2\sqrt{5}$.

Short Trick Remember, $9+4\sqrt{5} = (2+\sqrt{5})^2$ and $9-4\sqrt{5} = (\sqrt{5}-2)^2$. So the sum $= (2+\sqrt{5}) + (\sqrt{5}-2) = 2\sqrt{5}$, done in one line.

22 **ANSWER (a)** 19

SSC Phase-XIV (12th) 23 Sep 2026, Shift-II

Concept: Square/Cube Roots You should know these two values by heart: $45^2 = 2025$, $12^3 = 1728$

So $\sqrt{2025} + \sqrt[3]{1728} = 45 + 12 = 57$

19 goes into 57 three times: $57 \times \frac{8}{19} = 3 \times 8 = 24$

The last bracket is $2^5 - 3^3 = 32 - 27 = 5$. Now $24 - 5 =$ **19**.

23 **ANSWER (d)** $\frac{(16+4\sqrt{5})}{11}$

SSC Phase-XIV (12th) 23 Sep 2026, Shift-II

Concept: Rationalisation $\frac{1}{a-\sqrt{b}} = \frac{a+\sqrt{b}}{a^2-b}$

The first part is easy: $\frac{18}{9} + \frac{14}{7} = 2+2 = 4$

In the second part, $\frac{\sqrt{25}}{\sqrt{5}} = \sqrt{5}$, so the bracket becomes $4-\sqrt{5}$

Now rationalise the denominator:
$\frac{4}{4-\sqrt{5}} \times \frac{4+\sqrt{5}}{4+\sqrt{5}} = \frac{4(4+\sqrt{5})}{16-5} = \frac{16+4\sqrt{5}}{11}$

The correct option is $\frac{(16+4\sqrt{5})}{11}$.

Short Trick Save time in the exam. The answer must contain $\sqrt{5}$, so the three options with $\sqrt{3}$ go out straight away.

24 **ANSWER (a)** 1

SSC Phase-XIV (12th) 25 Sep 2026, Shift-II

Rule: Brackets First Solve both brackets separately, then divide.

First bracket: $0.3 + 0.6 = 0.9$. Second: $0.12 \times 7.5 = 0.9$, because $12 \times 75 = 900$.

Both come out equal, so $0.9 \div 0.9 = 1$. The answer is **1**.

25 **ANSWER (a)** 124.20

SSC Phase-XIV (12th) 25 Sep 2026, Shift-II

Concept: Approximation Drop the small decimal parts. When the options are far apart, that is good enough.

Left side, roughly: $50 \times 15.68 - 30 = 784 - 30 = 754$

So $20 + ? \approx \frac{754}{5.23} \approx 144.2$, which gives
$? \approx 144.2 - 20 = 124.2$

Among the options, **124.20** fits.

Short Trick Take $\frac{754}{5.23}$ as simply $\frac{754}{5} \approx 150$. Then ? comes to roughly 125-130, and the only option close by is 124.20.

26 **ANSWER (b)** 12

SSC Phase-XIV (12th) 26 Sep 2026, Shift-I

Open the brackets first: $10+2 = 12$ and $6-4 = 2$. What remains is $12 \times 2 \div 2$

Multiplication and division are at the same level, so go left to right: $12 \times 2 = 24$, then $24 \div 2 = 12$
The answer is **12**.

27 **ANSWER (a)** 123

SSC Phase-XIV (Matric) 16 Sep 2026, Shift-III

Rule: BODMAS After brackets come division and multiplication. Addition and subtraction come last.

Bracket: $224 \div 14 = 16$

Now multiplication first: $16 \times 7 = 112$. Then
$16 + 112 - 5 = 123$
So the answer works out to **123**.

Examiner's Trap Many students first do $16+16 = 32$ and then multiply by 7. Note that multiplication

always comes before addition.

28 **ANSWER (d)** 30

SSC Phase-XIV (Matric) 16 Sep 2026, Shift-III

Rule: BODMAS Inner brackets first, then the multiplication outside, and finally addition and subtraction from left to right.

Inside: $72 \div 12 = 6$ and $22 - 15 = 7$, so the big bracket $= 13$

$13 \times 2 = 26$, then $26 - 19 + 23 = 30$

That gives **30**.

Examiner's Trap Reading $-19 + 23$ as $-(19 + 23)$ is wrong. Go left to right: $26 - 19 = 7$, then $7 + 23 = 30$.

29 **ANSWER (c)** 1.6

SSC Phase-XIV (Matric) 16 Sep 2026, Shift-III

Let the number $= x$. We simply add $\frac{3}{4} = 0.75$ to it, so $x + 0.75 = 2.35$

$x = 2.35 - 0.75 = 1.6$, so the original number was **1.6**.

Examiner's Trap Here $\frac{3}{4}$ is added directly, not $\frac{3}{4}$ of the number. If you use $\frac{7}{4}x = 2.35$, no option will match.

30 **ANSWER (b)** 7.375

SSC Phase-XIV (Matric) 16 Sep 2026, Shift-III

Concept: Fraction to Decimal Remember $\frac{1}{8} = 0.125$. All the other eighths are built from this.

$\frac{3}{8} = 3 \times 0.125 = 0.375$

Now add the whole number 7: $7 + 0.375 = 7.375$. The correct option is **7.375**.

31 **ANSWER (b)** 27

SSC Phase-XIV (Matric) 17 Sep 2026, Shift-III

Rule: VBODMAS The bar (vinculum) comes first, then ( ), { } and [ ] in that order.

Start with the vinculum: $8 - 5 = 3$, so $7 - 3 = 4$

$2 \times 4 = 8$, then $\{6 + 8\} = 14$ and $[5 - 14] = -9$

Finally $18 - (-9) = 18 + 9 = 27$. The answer is **27**.

Examiner's Trap If you ignore the bar and take $7 - 8 - 5 = -6$, the whole answer changes. Also watch the sign in $-(-9)$, it becomes +.

32 **ANSWER (a)** 28

SSC Phase-XIV (Matric) 17 Sep 2026, Shift-III

Inside the brackets: $60 \div 12 = 5$, $19 - 12 = 7$. Adding them, the big bracket becomes 12.

$12 \times 2 = 24$, then left to right $24 - 16 + 20 = 28$

So **28** is correct.

33 **ANSWER (d)** $12\frac{6}{7}$

SSC Phase-XIV (Matric) 17 Sep 2026, Shift-III

Concept: Decimal & Fraction $\frac{5}{8} = 0.625$, and $0.175 = \frac{175}{1000} = \frac{7}{40}$

$2\frac{5}{8} = 2.625$, so the bracket $= 4.875 - 2.625 = 2.25 = \frac{9}{4}$

Now flip the divisor and multiply: $\frac{9}{4} \div \frac{7}{40} = \frac{9}{4} \times \frac{40}{7} = \frac{90}{7}$

$7 \times 12 = 84$, leaving a remainder of 6. So $\frac{90}{7} = 12\frac{6}{7}$, that is $12\frac{6}{7}$.

Short Trick There is a 7 hidden inside 0.175, so the denominator is sure to be 7. Only one option has that: $12\frac{6}{7}$.

34 **ANSWER (a)** 164

SSC Phase-XIV (Matric) 18 Sep 2026, Shift-III

Rule: BODMAS Even inside the bracket, division comes first, then addition.

Inside: $90 \div 10 = 9$ and $15 - 7 = 8$, so $9 + 8 = 17$

$17 \times 10 = 170$, and $170 - 6 =$ **164**.

35 **ANSWER (d)** 34

SSC Phase-XIV (Matric) 18 Sep 2026, Shift-III

First the two small brackets: $64 \div 8 = 8$ and $21 - 14 = 7$. The big bracket $= 15$

$15 \times 2 = 30$

Now addition and subtraction from left to right:
$30 - 18 + 22 = 34$
So the answer is **34**.

36 **ANSWER (b)** 64

SSC Phase-XIV (Matric) 19 Sep 2026, Shift-III

Rule: BODMAS Work from the inside out. In every bracket, division comes first and subtraction later.

Small brackets: $2 \times 4 = 8$ and $6 + 9 = 15$

Middle bracket: $15 - 15 \div 3 = 15 - 5 = 10$

Big bracket: $32 \div 8 \times 10 = 4 \times 10 = 40$. Then $24 + 40 = 64$

The answer is **64**.

Examiner's Trap In $\{15 - 15 \div 3\}$, subtracting first to get $0 \div 3 = 0$ is the trap. Division comes first.

37 ANSWER (b) 0.94

SSC Phase-XIV (Matric) 19 Sep 2026, Shift-III

Rule: 'Of' = Multiply In BODMAS, 'Of' means multiplication.

Innermost, division first: $1.8 \div 0.6 = 3$, so $1.2 + 3 = 4.2$

$0.5 \times 4.2 = 2.1$, then $0.25 + 2.1 = 2.35$

Now take 0.4 of this: $2.35 \times 0.4 = 0.94$

The correct option is **0.94**.

38 ANSWER (d) $\frac{6}{5}$

SSC Phase-XIV (Matric) 19 Sep 2026, Shift-III

First find the sum: $0.125 + 0.375 = 0.5$

We need $1\frac{7}{10} = 1.7$, so we must add $1.7 - 0.5 = 1.2 = \frac{6}{5}$

That is $\frac{6}{5}$.

39 ANSWER (c) 169

SSC Phase-XIV (Matric) 21 Sep 2026, Shift-III

Rule: BODMAS Brackets, then multiplication, then subtraction.

$96 \div 12 = 8$ and $16 - 8 = 8$, so the big bracket becomes 16.

$16 \times 11 = 176$, $176 - 7 = 169$

So the answer will be **169**.

40 ANSWER (b) 32

SSC Phase-XIV (Matric) 21 Sep 2026, Shift-III

$63 \div 9 = 7$, $20 - 13 = 7$, so the big bracket $= 14$

$14 \times 2 = 28$, then $28 - 17 + 21 = 32$. The answer is **32**.

Remember Note that this type of question comes again and again in the exam. Just solve the last $-17 + 21$ from left to right, which is a net $+4$.

41 ANSWER (b) $7\frac{1}{2}$

SSC Phase-XIV (Matric) 21 Sep 2026, Shift-III

Rule: Dividing by a Fraction $\frac{a}{b} \div \frac{c}{d} = \frac{a}{b} \times \frac{d}{c}$

First convert the mixed fraction: $4\frac{1}{2} = \frac{9}{2}$

$\frac{9}{2} \times \frac{5}{3} = \frac{15}{2} = 7\frac{1}{2}$, so the answer is $7\frac{1}{2}$.

42 ANSWER (d) 458

SSC Phase-XIV (Matric) 22 Sep 2026, Shift-III

Rule: BODMAS Work out powers and roots first, along with the brackets.

$22^2 = 484$, $3^2 = 9$, $\sqrt{576} = 24$, $20 + 21 = 41$

Now left to right: $484 - 9 + 24 - 41 = 458$

The correct answer is **458**.

43 ANSWER (c) 34

SSC Phase-XIV (Matric) 22 Sep 2026, Shift-III

Brackets first: $80 \div 10 = 8$, $23 - 16 = 7$. The big bracket becomes 15.

$15 \times 2 = 30$, then $30 - 20 + 24 = 34$

So the answer is **34**.

44 ANSWER (c) 7

SSC Phase-XIV (Matric) 22 Sep 2026, Shift-III

All three are perfect squares: $\sqrt{1600} = 40$, $\sqrt{900} = 30$, $\sqrt{100} = 10$

$\frac{40 + 30}{10} = \frac{70}{10} = 7$, that is **7**.

Examiner's Trap Writing $\sqrt{1600 + 900} = \sqrt{2500} = 50$ is wrong. The square roots are taken separately here, so you do not add first.

45 ANSWER (b) 2

SSC Phase-XIV (Matric) 22 Sep 2026, Shift-III

Convert everything to decimals: $\frac{3}{8} = 0.375$ and $1\frac{1}{2} = 1.5$

$0.375 + 0.125 = 0.5$, then $0.5 + 1.5 = 2$. That's it, the answer is **2**.

46 **ANSWER (c)** $\frac{109}{30}$

SSC Phase-XIV (Matric) 23 Sep 2026, Shift-III

Rule: BODMAS Start from the innermost bracket and keep moving outwards.

Small bracket: $\frac{3}{2}-\frac{1}{3}-\frac{1}{6}=\frac{9-2-1}{6}=1$

Middle bracket: $\frac{7}{4}-\frac{1}{2}\times 1=\frac{7}{4}-\frac{2}{4}=\frac{5}{4}$

Big bracket: $\frac{7}{3}\div\frac{5}{4}=\frac{7}{3}\times\frac{4}{5}=\frac{28}{15}$

Finally $\frac{11}{2}-\frac{28}{15}=\frac{165-56}{30}=\frac{109}{30}$

So $\frac{109}{30}$ is correct.

Short Trick In the last step, the LCM of the denominators 2 and 15 is 30. So the option with denominator 30 is the answer.

47 **ANSWER (b)** 1

SSC Phase-XIV (Matric) 23 Sep 2026, Shift-III

Rule: BODMAS Inside out. In the middle bracket, multiplication comes first and addition after.

Small bracket: $1.5-0.2-0.3=1$

Middle bracket: $0.7+0.1\times 1=0.7+0.1=0.8$

$2.8\div 0.8=3.5$, so $4.5-3.5=1$. The answer is **1**.

Short Trick To remove the decimals in $2.8\div 0.8$, multiply both top and bottom by 10: $\frac{28}{8}=3.5$

48 **ANSWER (b)** 0.9 m

SSC Phase-XIV (Matric) 23 Sep 2026, Shift-III

Half a metre means $\frac{1}{2}$ m $=0.5$ m. Now add the two pieces: $0.4+0.5=0.9$ m, which is **0.9 m**.

49 **ANSWER (d)** 18

SSC Phase-XIV (Matric) 24 Sep 2026, Shift-III

Rule: BODMAS Inside the bracket, division first, then addition.

$4-3=1$ and $18\div 6=3$, so the bracket $=3+1=4$

$4\times 5=20$, $20-2=18$. The correct option is **18**.

50 **ANSWER (b)** 17

SSC Phase-XIV (Matric) 24 Sep 2026, Shift-III

$18\div 3=6$, $4-2=2$, so the big bracket is 8.

$8\times 2=16$. Then $16-5+6=17$

So the answer works out to **17**.

51 **ANSWER (c)** 409

SSC Phase-XIV (Matric) 25 Sep 2026, Shift-III

Rule: BODMAS Work out powers, roots and brackets first, then add and subtract from left to right.

$21^2=441$, $4^2=16$, $\sqrt{529}=23$, $19+20=39$

$441-16+23-39=409$, that is **409**.

Short Trick Look only at the unit digits: $1-6+3-9$ gives a unit digit of 9. Among the options, only 409 has it.

52 **ANSWER (a)** 16

SSC Phase-XIV (Matric) 25 Sep 2026, Shift-III

$20\div 4=5$ and $6-5=1$. The big bracket $=6$

$6\times 2=12$, then $12-3+7=16$

The answer is **16**.

53 **ANSWER (c)** 2

SSC Phase-XIV (Matric) 25 Sep 2026, Shift-III

Rule: BODMAS Brackets first, then division. And remember, dividing by a fraction means multiplying by its reciprocal.

First, simplify the mixed fractions: $2\frac{1}{3}=\frac{7}{3}=\frac{14}{6}$ and $1\frac{5}{6}=\frac{11}{6}$

Now the bracket: $\frac{14}{6}-\frac{11}{6}=\frac{3}{6}=\frac{1}{2}$

Finally, $\frac{1}{2}\div\frac{1}{4}=\frac{1}{2}\times 4=2$

So the answer is **2**.

Examiner's Trap If you read $\div\frac{1}{4}$ as $\times\frac{1}{4}$ in a hurry, you will get $\frac{1}{8}$, and that is sitting in the options too. Never forget to flip the fraction when dividing.

54 **ANSWER (b)** 5.35 litres

SSC Phase-XIV (Matric) 25 Sep 2026, Shift-III

First, convert $2\frac{3}{5}$ into a decimal: $2+0.6=2.6$ litres

Total water gone = 2.6 + 0.45 = 3.05 litres

Water left = 8.4 − 3.05 = **5.35 litres**

03 CHAPTER
LCM & HCF

Questions *5 questions · 4 shifts*

LCM & HCF

Directions (Q. 01–05): *Choose the correct answer from the four given options.*

01 Find the smallest number that is a perfect square and is divisible by 6, 10, 15 and 30.

SSC Phase-XIV (Graduation) 24 Sep 2026, Shift-I

(a) 400 (b) 900 (c) 2500 (d) 1600

02 Find the smallest number which, when divided by 12, 15 and 18, leaves a remainder of 7 in each case.

SSC Phase-XIV (12th) 16 Sep 2026, Shift-II

(a) 181 (b) 185 (c) 183 (d) 187

03 A construction company keeps steel rods in bundles, where the length of each rod (in cm) is a 5-digit number. Two types of rods were received from different suppliers, and all rods of the same type have the same length. It was found that rods of one type are 11088 cm long and rods of the other type are 17280 cm long. The manager wants to cut both types of rods into smaller rods of the same maximum length (with no part of any rod left over), so that they can be used interchangeably in modular construction. What is the maximum length (in cm) of each smaller rod that can be cut from both types?

SSC Phase-XIV (12th) 21 Sep 2026, Shift-II

(a) 138 (b) 144 (c) 150 (d) 145

04 Find the greatest number which, when it divides 125, 161 and 197, leaves a remainder of 5 in each case.

SSC Phase-XIV (Matric) 23 Sep 2026, Shift-III

(a) 12 (b) 14 (c) 16 (d) 18

05 Three alarm clocks ring after every 13, 26 and 39 minutes respectively. If they ring together at 8:00 a.m., after how many minutes will they ring together again?

SSC Phase-XIV (Matric) 23 Sep 2026, Shift-III

(a) 78 (b) 117 (c) 91 (d) 104

Answer Key *SSC official key*

LCM & HCF (Q. 01–05)									
01	(b)	02	(d)	03	(b)	04	(a)	05	(a)

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LCM & HCF

01 **ANSWER (b)** 900

SSC Phase-XIV (Graduation) 24 Sep 2026, Shift-I

Concept: LCM + Perfect Sq. In the prime factors of the LCM, multiply once more by every factor whose power is odd. That gives you the smallest perfect square multiple.

LCM(6, 10, 15, 30) = 30 = $2 \times 3 \times 5$

Here all three have power 1, so multiply each of them once more: $2^2 \times 3^2 \times 5^2 = 900$

Let us check: 900 = 30^2, and 900 ÷ 30 = 30 ✓
So **900** is correct.

Short Trick Among the options, only 900 is divisible by 3. The digit sums of 400, 2500 and 1600 are not divisible by 3, so tick 900 straight away.

02 **ANSWER (d)** 187

SSC Phase-XIV (12th) 16 Sep 2026, Shift-II

Formula: Same Remainder Number = LCM(divisors) × k + remainder

$12 = 2^2 \times 3$, $15 = 3 \times 5$, $18 = 2 \times 3^2$, so LCM = $2^2 \times 3^2 \times 5 = 180$

We need the smallest number, so take k = 1: 180 + 7 = **187**

Short Trick Subtract 7 from each option. The one that is exactly divisible by all of 12, 15 and 18 is the answer. 187 − 7 = 180 ✓

03 **ANSWER (b)** 144

SSC Phase-XIV (12th) 21 Sep 2026, Shift-II

Concept: HCF The greatest length that measures both lengths exactly is always their HCF.

$11088 = 2^4 \times 3^2 \times 7 \times 11$

$17280 = 2^7 \times 3^3 \times 5$

Pick the lower powers of the common factors: HCF = $2^4 \times 3^2 = 16 \times 9 = 144$ cm
The correct option is **144**.

Short Trick You can get it from the options as well. 145 and 150 have the factor 5, but 11088 has no 5 in it. 138 = 2×3×23 has 23, which is in neither number. Only 144 is left.

04 **ANSWER (a)** 12

SSC Phase-XIV (Matric) 23 Sep 2026, Shift-III

Formula: Same Remainder HCF Number = HCF(each number − remainder)

First subtract the remainder: 125 − 5 = 120, 161 − 5 = 156, 197 − 5 = 192

$120 = 2^3 \times 3 \times 5$, $156 = 2^2 \times 3 \times 13$, $192 = 2^6 \times 3$

Common to all three: HCF = $2^2 \times 3 = 12$, that is, **12**.

Examiner's Trap The divisor must always be greater than the remainder, and here 12 > 5 ✓. 14, 16 and 18 do not divide all three numbers (120, 156, 192) exactly, so they are out.

05 **ANSWER (a)** 78

SSC Phase-XIV (Matric) 23 Sep 2026, Shift-III

Concept: Together Again When will they happen together again? Just take the LCM of the intervals.

$13 = 13$, $26 = 2 \times 13$, $39 = 3 \times 13$

LCM = $2 \times 3 \times 13 = 78$ minutes, so the answer is **78**.

04 CHAPTER
Average

Questions *21 questions · 12 shifts*

Average

Directions (Q. 01–21): *Choose the correct answer from the four given options.*

01 The average age of a committee of 12 members is 40 years. A member aged 55 years retires and is replaced by a new member aged 31 years. What is the new average age of the committee?

SSC Phase-XIV (Graduation) 17 Sep 2026, Shift-I

(a) 35 years (b) 42 years
(c) 38 years (d) 48 years

02 Given that the average of five consecutive odd numbers is 27, find the product of the first and the last number.

SSC Phase-XIV (Graduation) 19 Sep 2026, Shift-I

(a) 713 (b) 654 (c) 852 (d) 546

03 The average of 5 consecutive odd numbers is 61. What is the difference between the largest and the smallest number?

SSC Phase-XIV (Graduation) 24 Sep 2026, Shift-I

(a) 5 (b) 8 (c) 6 (d) 3

04 The average of 5 numbers is 24. If a sixth number, 30, is included, what will be the new average?

SSC Phase-XIV (Matric) 16 Sep 2026, Shift-III

(a) 24 (b) 25 (c) 26 (d) 27

05 The average of the first 12 natural numbers is 6.5. If the first 12 even numbers are added to this set, what will be the combined average of all 24 numbers?

SSC Phase-XIV (Matric) 16 Sep 2026, Shift-III

(a) 9.25 (b) 9.5 (c) 9.75 (d) 10

06 The average of the marks obtained by Madhu in 4 subjects is 64. If she obtained 69 marks in the fifth subject, find the new average of the marks obtained by her in all 5 subjects.

SSC Phase-XIV (Matric) 17 Sep 2026, Shift-III

(a) 68 (b) 88 (c) 65 (d) 78

07 The average of 100 numbers is 44. If four new numbers are included, the average of the whole set becomes 50. Find the average of the four newly added numbers.

SSC Phase-XIV (Matric) 17 Sep 2026, Shift-III

(a) 150 (b) 180 (c) 200 (d) 220

08 The average temperature of a city from Monday to Thursday was 28°C. If the temperature on Friday was 32°C, what was the average temperature for all five days?

SSC Phase-XIV (Matric) 18 Sep 2026, Shift-III

(a) 28.4°C (b) 28.8°C (c) 29°C (d) 29.2°C

09 The average of 6 numbers is 18. If each number is increased by 4, what will be the average of the new numbers?

SSC Phase-XIV (Matric) 18 Sep 2026, Shift-III

(a) 20 (b) 21 (c) 22 (d) 23

10 The average value of a collection of 50 numbers is 75. If the average of the first 25 numbers of this collection is 65, calculate the average of the remaining 25 numbers.

SSC Phase-XIV (Matric) 19 Sep 2026, Shift-III

(a) 75 (b) 105 (c) 95 (d) 85

11 The average age of 25 students is 18 years. When 5 more students join, the average rises to 19 years. What is the average age of the new students?

SSC Phase-XIV (Matric) 19 Sep 2026, Shift-III

(a) 16 years (b) 18 years
(c) 20 years (d) 24 years

12 Ritu's average monthly saving for 4 months is Rs. 1800. If she saved Rs. 2100 in the fifth month, what is her average saving for all 5 months?

SSC Phase-XIV (Matric) 21 Sep 2026, Shift-III

(a) Rs. 1800 (b) Rs. 1860
(c) Rs. 1920 (d) Rs. 1980

13 The average of 11 numbers is 32. If the average of the first 6 numbers is 29, what is the average of the remaining 5 numbers?

SSC Phase-XIV (Matric) 21 Sep 2026, Shift-III

(a) 34 (b) 35 (c) 35.6 (d) 36

14 The average of 7 consecutive integers is 26. What is the largest integer?

SSC Phase-XIV (Matric) 22 Sep 2026, Shift-III

(a) 27 (b) 28 (c) 29 (d) 30

15 The average of 9 numbers is 46. If one of the numbers, 62, is replaced by 35, what will be the new average?

SSC Phase-XIV (Matric) 22 Sep 2026, Shift-III

(a) 42 (b) 43 (c) 44 (d) 45

16 The average of six numbers 52, 71, 43, 22, a and b is 55. The average of seven numbers 42, 45, 49, 51, 42, c and d is 53. Find the average of a, b, c and d.

SSC Phase-XIV (Matric) 23 Sep 2026, Shift-III

(a) 71 (b) 85 (c) 96 (d) 142

17 The average age of 40 students in a class is 16 years. If a student aged 17 years is replaced by a new student, the average age of the class becomes 15.875 years. Find the age of the new student.

SSC Phase-XIV (Matric) 23 Sep 2026, Shift-III

(a) 5 years (b) 12 years
(c) 17 years (d) 22 years

18 A batsman's average score in 4 innings is 42. In the fifth innings he scores 58 runs. What is his average after 5 innings?

SSC Phase-XIV (Matric) 24 Sep 2026, Shift-III

(a) 44 (b) 45.2 (c) 46 (d) 47

19 The average weight of 8 students is 51 kg. If the weight of the teacher is also included, the average becomes 55 kg. What is the weight of the teacher?

SSC Phase-XIV (Matric) 24 Sep 2026, Shift-III

(a) 82 kg (b) 84 kg (c) 87 kg (d) 90 kg

20 What is the average of the first 'n' natural numbers, where $n = 30$?

SSC Phase-XIV (Matric) 25 Sep 2026, Shift-III

(a) 15 (b) 15.5 (c) 16 (d) 16.5

21 The average marks of 10 students is 68. If the highest and lowest marks, 96 and 40, are removed, what will be the average of the remaining students?

SSC Phase-XIV (Matric) 25 Sep 2026, Shift-III

(a) 66 (b) 67 (c) 68 (d) 69

Answer Key *SSC official key*

Average (Q. 01–21)

01	(c)	**02**	(a)	**03**	(b)	**04**	(b)	**05**	(c)	**06**	(c)	**07**	(c)	**08**	(b)	**09**	(c)	**10**	(d)
11	(d)	**12**	(b)	**13**	(c)	**14**	(c)	**15**	(b)	**16**	(a)	**17**	(b)	**18**	(b)	**19**	(c)	**20**	(b)
21	(c)																		

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Average

01 **ANSWER (c)** 38 years

SSC Phase-XIV (Graduation) 17 Sep 2026, Shift-I

Concept: Replacement New average = old average + (new − old) ÷ number of members

The 55-year-old left and a 31-year-old came in. The total age fell by 55 − 31 = 24 years.

This drop of 24 years is shared among 12 people: 24 ÷ 12 = 2 years

New average = 40 − 2 = **38 years**

02 **ANSWER (a)** 713

SSC Phase-XIV (Graduation) 19 Sep 2026, Shift-I

Concept: Consecutive Numbers When the number of terms is odd, the average is the middle term itself.

There are 5 numbers, so the third number = 27. The numbers are 23, 25, 27, 29, 31

First × last = $23 \times 31 = 713$
So mark **713** in the options.

Short Trick Use $(a-b)(a+b)$:
$(27-4)(27+4) = 27^2 - 4^2 = 729 - 16 = 713$

03 **ANSWER (b)** 8

SSC Phase-XIV (Graduation) 24 Sep 2026, Shift-I

Consecutive odd numbers always differ by 2. With 5 numbers, there are 4 gaps from the first to the last.

Difference = $4 \times 2 = 8$
You can check it if you like: the numbers are 57, 59, 61, 63, 65 and 65 − 57 = **8**

Examiner's Trap The average 61 is given here only to distract you. The difference depends only on the number of terms. Thinking '5 terms, so 5×2 = 10' is wrong. There are only 4 gaps.

04 **ANSWER (b)** 25

SSC Phase-XIV (Matric) 16 Sep 2026, Shift-III

Total of the 5 numbers = $5 \times 24 = 120$

Adding 30 makes the total 150, and now there are 6 numbers

New average = 150 ÷ 6 = **25**

Short Trick The new number is 6 more than the average. Spread this 6 over all 6 numbers and the average rises by 1: 24 + 1 = 25

05 **ANSWER (c)** 9.75

SSC Phase-XIV (Matric) 16 Sep 2026, Shift-III

Formula: Sum Sum of the first n natural numbers = $\frac{n(n+1)}{2}$ and sum of the first n even numbers = $n(n+1)$

Sum of the first 12 natural numbers = $12 \times 6.5 = 78$

Sum of the first 12 even numbers (2 to 24) = $12 \times 13 = 156$

Total = 78 + 156 = 234, and there are 24 numbers in all. Average = $\frac{234}{24} = 9.75$
That is, **9.75**.

Short Trick Both groups have 12 numbers each, so the combined average is simply the average of the two averages: (6.5 + 13) ÷ 2 = 9.75

06 **ANSWER (c)** 65

SSC Phase-XIV (Matric) 17 Sep 2026, Shift-III

Total marks in 4 subjects = $4 \times 64 = 256$

Add the fifth subject: 256 + 69 = 325

325 ÷ 5 = **65**, which is the new average.

Short Trick 69 is 5 more than the average. Shared over 5 subjects, the average goes up by 1, so 64 + 1 = 65

07 **ANSWER (c)** 200

SSC Phase-XIV (Matric) 17 Sep 2026, Shift-III

Total of the original 100 numbers = $100 \times 44 = 4400$

Now there are 104 numbers, total = $104 \times 50 = 5200$

Sum of the four new numbers = 5200 − 4400 = 800. Their average = 800 ÷ 4 = **200**

Short Trick Average of new numbers = new average +

(old count × increase) ÷ new count = $50 + \frac{100 \times 6}{4} = 50 + 150 = 200$

08 **ANSWER (b)** 28.8°C

SSC Phase-XIV (Matric) 18 Sep 2026, Shift-III

Monday to Thursday means 4 days, total = $4 \times 28 = 112$

Add Friday's 32: 112 + 32 = 144

Average for five days = 144 ÷ 5 = **28.8°C**

Examiner's Trap Monday to Thursday is 4 days, not 5. Get this count wrong and the whole answer goes wrong.

09 **ANSWER (c)** 22

SSC Phase-XIV (Matric) 18 Sep 2026, Shift-III

Concept: Property of Average If you add x to every number, the average also goes up by exactly x.

Here 4 is added to every number, so no calculation is needed: 18 + 4 = **22**

10 **ANSWER (d)** 85

SSC Phase-XIV (Matric) 19 Sep 2026, Shift-III

Total of 50 numbers = $50 \times 75 = 3750$

Total of the first 25 = $25 \times 65 = 1625$

Total of the remaining 25 = 3750 − 1625 = 2125, so their average is 2125 ÷ 25 = **85**

Short Trick Both parts are equal (25 each), so the overall average sits exactly in the middle. The average of 65 and x is 75, which means x = 85

11 **ANSWER (d)** 24 years

SSC Phase-XIV (Matric) 19 Sep 2026, Shift-III

Total age of 25 students = $25 \times 18 = 450$ years

After 5 new students join, total age of 30 students = $30 \times 19 = 570$ years

Combined age of the 5 new students = 570 − 450 = 120, so their average is 120 ÷ 5 = **24 years**

Short Trick Average of new students = $19 + \frac{25 \times 1}{5} = 19 + 5 = 24$ years

12 **ANSWER (b)** Rs. 1860

SSC Phase-XIV (Matric) 21 Sep 2026, Shift-III

Total saving for 4 months = $4 \times 1800 = 7200$

Add the 2100 of the fifth month: 7200 + 2100 = 9300

Average = 9300 ÷ 5 = 1860
So the answer is **Rs. 1860**.

Short Trick 2100 is 300 more than the average. Spread over 5 months, that adds 60, and 1800 + 60 = 1860

13 **ANSWER (c)** 35.6

SSC Phase-XIV (Matric) 21 Sep 2026, Shift-III

Total of 11 numbers = $11 \times 32 = 352$

Total of the first 6 = $6 \times 29 = 174$

Total of the remaining 5 = 352 − 174 = 178. Average = 178 ÷ 5 = **35.6**

Short Trick The first 6 numbers fall short of the average by $6 \times 3 = 18$ in all. The other 5 make up this shortfall: $32 + \frac{18}{5} = 35.6$

14 **ANSWER (c)** 29

SSC Phase-XIV (Matric) 22 Sep 2026, Shift-III

Concept: Consecutive Numbers If the number of terms is odd, average = middle term

There are 7 terms, so the 4th term = 26. After it come 3 more terms.

Largest number = 26 + 3 = **29** (the numbers run from 23 to 29)

15 **ANSWER (b)** 43

SSC Phase-XIV (Matric) 22 Sep 2026, Shift-III

35 came in place of 62, so the total dropped by 62 − 35 = 27.

Divide by the 9 numbers: the average falls by 27 ÷ 9 = 3.

New average = 46 − 3 = **43**

16 **ANSWER (a)** 71

SSC Phase-XIV (Matric) 23 Sep 2026, Shift-III

First group: $6 \times 55 = 330$. The given numbers add up to 52 + 71 + 43 + 22 = 188, so a + b = 330 − 188 = 142

Second group: $7 \times 53 = 371$. The given numbers add up to 42 + 45 + 49 + 51 + 42 = 229, so c + d = 371 − 229 = 142

Now the average of a, b, c, d = $\frac{142+142}{4} = \frac{284}{4} = 71$
That makes **71** the correct option.

Examiner's Trap Many students find 142 and stop right there, and option D is kept exactly for this mistake. You have to take the sum of all four and divide by 4.

17 ANSWER (b) 12 years

SSC Phase-XIV (Matric) 23 Sep 2026, Shift-III

How much did the average fall? 16 − 15.875 = 0.125 years

Drop in total age over 40 students = $40 \times 0.125 = 5$ years

This means the new student is 5 years younger than the one who left: 17 − 5 = **12 years**

Examiner's Trap Do not take the 5-year drop itself as the new student's age (option A). It has to be subtracted from 17.

18 ANSWER (b) 45.2

SSC Phase-XIV (Matric) 24 Sep 2026, Shift-III

Total of the first 4 innings = $4 \times 42 = 168$

Add the 58 runs of the fifth innings: 168 + 58 = 226

Average = 226 ÷ 5 = **45.2**

Short Trick 58 is 16 more than the average:
$42 + \frac{16}{5} = 42 + 3.2 = 45.2$

19 ANSWER (c) 87 kg

SSC Phase-XIV (Matric) 24 Sep 2026, Shift-III

Total weight of 8 students = $8 \times 51 = 408$ kg

Including the teacher, total of 9 people = $9 \times 55 = 495$ kg

Teacher's weight = 495 − 408 = **87 kg**

Short Trick Teacher's weight = new average + old members × increase = $55 + 8 \times 4 = 87$ kg

20 ANSWER (b) 15.5

SSC Phase-XIV (Matric) 25 Sep 2026, Shift-III

Formula: Natural No. Average Average of the first n natural numbers = $\frac{n+1}{2}$

Put $n = 30$: $\frac{30+1}{2} = \frac{31}{2} = 15.5$
So you get **15.5**.

Examiner's Trap Writing $\frac{n}{2} = 15$ in a hurry is a common mistake. The formula is $\frac{n+1}{2}$.

21 ANSWER (c) 68

SSC Phase-XIV (Matric) 25 Sep 2026, Shift-III

Total marks of 10 students = $10 \times 68 = 680$

Marks removed = 96 + 40 = 136, so the total of the remaining 8 students = 680 − 136 = 544

Average = 544 ÷ 8 = **68**

Short Trick The average of 96 and 40 is also 68. Removing marks whose own average is 68 does not change the average at all.

05 CHAPTER
Percentage

Questions *19 questions · 16 shifts*

Percentage

Directions (Q. 01–19): *Choose the correct answer from the four given options.*

01 Suresh's monthly income is Rs18,000 and his monthly expenditure is Rs12,000. Next year, his income increases by 20% and his expenditure increases by 15%. Find the percentage increase in his savings.

SSC Phase-XIV (Graduation) 17 Sep 2026, Shift-I

(a) 15% (b) 25% (c) 30% (d) 40%

02 Anita's monthly income is Rs24,000 and her monthly expenditure is Rs16,000. If her income increases by 25% and her expenditure increases by 10%, find the percentage increase in her savings.

SSC Phase-XIV (Graduation) 19 Sep 2026, Shift-I

(a) 40% (b) 75% (c) 80% (d) 55%

03 If P is 25% more than Q, and R is 40% less than the sum of P and Q, then by what percentage is R more than P?

SSC Phase-XIV (Graduation) 22 Sep 2026, Shift-I

(a) 6% (b) 12% (c) 8% (d) 14%

04 Free delivery on orders above 500. A customer buys items worth Rs480 and pays a shipping charge of Rs50. By what % more value should he have shopped to avoid shipping?

SSC Phase-XIV (Graduation) 23 Sep 2026, Shift-I

(a) 4% (b) 4.17% (c) 5% (d) 5.18%

05 An audit reveals that assets invested in schemes giving 12% and 18% returns yield an average return of 15%. If the total investment is Rs6,00,000, how much is invested in the lower-return scheme?

SSC Phase-XIV (Graduation) 23 Sep 2026, Shift-I

(a) Rs2,00,000 (b) Rs2,50,000
(c) Rs3,00,000 (d) Rs3,50,000

06 In an innings of 108 runs, a batsman hit 9 fours and 3 sixes. Find the percentage of runs made by running between the wickets.

SSC Phase-XIV (Graduation) 24 Sep 2026, Shift-I

(a) 50% (b) 65% (c) 32% (d) 48%

07 The income of A is 80% of the income of B and the expenditure of A is 60% of the expenditure of B. If the income of A is equal to 120% of the expenditure of B, then by what percentage is the savings of A more than the savings of B?

SSC Phase-XIV (12th) 16 Sep 2026, Shift-II

(a) 15% (b) 18% (c) 20% (d) 22%

08 A food truck uses 250 kg of flour per month. With a new eco-friendly recipe, it reduces its flour usage by 20%. How much flour is saved in a month?

SSC Phase-XIV (12th) 17 Sep 2026, Shift-II

(a) 50 (b) 10 (c) 20 (d) 30

09 A person took part in a three-round gambling game. According to the rules of the game, if he wins a round he gets Rs200, but after each round he has to pay 50% of the total amount he has at that time. He was lucky and won all three rounds. After completing all three rounds, he found that he had lost three-fourths of his initial amount. Find the

initial amount he had before starting the game.

SSC Phase-XIV (12th) 18 Sep 2026, Shift-II

(a) Rs1,250 (b) Rs1,400 (c) Rs1,500 (d) Rs1,600

10 In an examination, 70% of the students passed in Arithmetic, 55% of the students passed in Reasoning and 20% of the students failed in both subjects. If 125 students passed in Arithmetic only, find how many students failed in Reasoning only.

SSC Phase-XIV (12th) 19 Sep 2026, Shift-II

(a) 145 (b) 120 (c) 125 (d) 225

11 A distance of 120 km was wrongly measured as 126 km. The error percentage is:

SSC Phase-XIV (12th) 22 Sep 2026, Shift-II

(a) 7% (b) 5% (c) 8% (d) 6%

12 A salesman is given a commission of 7.5% on the total sales made by him and an additional bonus of 0.5% on sales above Rs20,000. If his total earning is Rs1920, find the value of the total sales made by him.

SSC Phase-XIV (12th) 23 Sep 2026, Shift-II

(a) Rs. 23,000 (b) Rs. 24,450
(c) Rs. 25,250 (d) Rs. 22,500

13 An interval of 2 hours 30 minutes is wrongly estimated as 2 hours 36 minutes. The error percentage is:

SSC Phase-XIV (12th) 25 Sep 2026, Shift-II

(a) 3% (b) 6% (c) 4% (d) 7%

14 In a class of 200 students, 35% are girls. What is the number of boys?

SSC Phase-XIV (Matric) 17 Sep 2026, Shift-III

(a) 120 (b) 125 (c) 130 (d) 135

15 The number of students in a school increased from 800 to 920 in a year. What is the percentage increase?

SSC Phase-XIV (Matric) 17 Sep 2026, Shift-III

(a) 12% (b) 14% (c) 15% (d) 16%

16 A salary is increased by 20% and then decreased by 10%. If the original salary was Rs. 25,000, what is the final salary?

SSC Phase-XIV (Matric) 19 Sep 2026, Shift-III

(a) Rs. 26,000 (b) Rs. 27,000
(c) Rs. 27,500 (d) Rs. 28,000

17 If 0.6 of a number is equal to $2\frac{2}{5}$, then the number is:

SSC Phase-XIV (Matric) 21 Sep 2026, Shift-III

(a) $3\frac{1}{2}$ (b) 4 (c) $4\frac{1}{5}$ (d) 5

18 After a decrease of 25%, the price of a watch becomes Rs900. What was its original price?

SSC Phase-XIV (Matric) 23 Sep 2026, Shift-III

(a) Rs. 1100 (b) Rs. 1150
(c) Rs. 1200 (d) Rs. 1250

19 A share starts at Rs45.50. It increases by $\frac{1}{10}$ of its value, and then its new value decreases by 0.2. What is the final value?

SSC Phase-XIV (Matric) 23 Sep 2026, Shift-III

(a) Rs50.06 (b) Rs20.08 (c) Rs30.05 (d) Rs40.04

Answer Key *SSC official key*

Percentage (Q. 01–19)

01	(c)	02	(d)	03	(c)	04	(b)	05	(c)	06	(a)	07	(c)	08	(a)	09	(b)	10	(c)
11	(b)	12	(c)	13	(c)	14	(c)	15	(c)	16	(b)	17	(b)	18	(c)	19	(d)		

Detailed Explanations रटना बंद, समझना शुरू

Percentage

01 **ANSWER (c)** 30%

SSC Phase-XIV (Graduation) 17 Sep 2026, Shift-I

Concept: Savings Savings = Income − Expenditure

Earlier savings = 18000 − 12000 = 6000

Income rose by 20%, that is, by 3600. Expenditure rose by 15%, that is, by 1800.

So the increase in savings = 3600 − 1800 = 1800

Percentage increase = $\frac{1800}{6000} \times 100 = 30\%$
The correct option is **30%**.

Examiner's Trap Taking 20% − 15% = 5% as the rise in savings is wrong. First find the difference in rupees, then turn it into a percentage of the old savings.

02 **ANSWER (d)** 55%

SSC Phase-XIV (Graduation) 19 Sep 2026, Shift-I

Old savings = 24000 − 16000 = 8000

Income goes up by 25%, that is, 6000, and expenditure by 10%, that is, 1600.

Rise in savings = 6000 − 1600 = 4400

As a percentage: $\frac{4400}{8000} \times 100 = 55\%$, which is **55%**.

03 **ANSWER (c)** 8%

SSC Phase-XIV (Graduation) 22 Sep 2026, Shift-I

Let Q = 100, then P = 125

P + Q = 225, and R is 60% of this: $225 \times 0.6 = 135$

How much more is R than P?
$\frac{135-125}{125} \times 100 = \frac{10}{125} \times 100 = 8\%$
So we choose **8%**.

Examiner's Trap The percentage is taken on the value being compared with, which here is P = 125. If you take it on Q = 100, you will get 10%, which is wrong.

04 **ANSWER (b)** 4.17%

SSC Phase-XIV (Graduation) 23 Sep 2026, Shift-I

For free delivery, we take shopping up to Rs500. So he needed to buy 500 − 480 = Rs20 more

Percentage = $\frac{20}{480} \times 100 = \frac{25}{6} \approx 4.17\%$
The answer is **4.17%**. (The question says 'above 500', which is loose wording, but in the exam this answer was taken with 500 as the limit.)

Examiner's Trap The percentage is taken on the actual purchase of 480, not on 500. Option A, 20/500 = 4%, is wrong. The Rs50 shipping charge is given here only to distract you.

05 **ANSWER (c)** Rs3,00,000

SSC Phase-XIV (Graduation) 23 Sep 2026, Shift-I

Concept: Alligation Ratio of the two amounts = (higher − average) : (average − lower)

12% scheme : 18% scheme = (18 − 15) : (15 − 12) = 3 : 3 = 1 : 1

This means equal money went into both schemes: 600000 ÷ 2 = **Rs3,00,000**

Short Trick 15% lies exactly midway between 12% and 18%. Without any calculation, you can see that the investment in both is equal.

06 **ANSWER (a)** 50%

SSC Phase-XIV (Graduation) 24 Sep 2026, Shift-I

Fours give $9 \times 4 = 36$ runs and sixes give $3 \times 6 = 18$ runs. Total from boundaries = 54

Runs made by running = 108 − 54 = 54

$\frac{54}{108} \times 100 = 50\%$, so half the runs came from running.
The answer is **50%**.

07 **ANSWER (c)** 20%

SSC Phase-XIV (12th) 16 Sep 2026, Shift-II

Concept: Savings Savings = Income − Expenditure. The question asks 'how much % more than', so the base will be B's savings.

Let B's expenditure = 100. Then A's income = 120% of 100 = 120.

A's income is 80% of B's income, so B's income = $\frac{120}{0.8} = 150$.

B's savings = 150 − 100 = 50.

A's expenditure = 60% of B's expenditure = 60, so A's savings = 120 − 60 = 60.

Now % more = $\frac{60-50}{50} \times 100 = 20\%$.

So A saves **20%** more than B.

Short Trick Take the quantity that is linked to most of the other values (here, B's expenditure) as 100. The whole calculation then works out in whole numbers.

08 ANSWER (a) 50

SSC Phase-XIV (12th) 17 Sep 2026, Shift-II

The flour it no longer uses is the saving. So we need 20% of 250 kg.

$250 \times \frac{20}{100} = 50$, so the saving is **50** kg.

09 ANSWER (b) Rs1,400

SSC Phase-XIV (12th) 18 Sep 2026, Shift-II

Three-fourths of the money is gone, so at the end only $\frac{1}{4}$ of the initial amount is left. Let the initial amount = 4x. Then x is left at the end.

Now work backwards. In each round, 200 is added first and then half goes away. So while going back, we first double the amount and then subtract 200.

Before the third round: 2x − 200

Before the second round: 2(2x − 200) − 200 = 4x − 600

Before the first round: 2(4x − 600) − 200 = 8x − 1400

This is the initial amount 4x: 8x − 1400 = 4x, so x = 350.

Initial amount = 4 × 350 = **Rs1,400**.

Short Trick Check from the options: from 1400 we get (1400+200)/2 = 800, then (800+200)/2 = 500, then (500+200)/2 = 350. And 350 really is $\frac{1}{4}$ of 1400 ✔

10 ANSWER (c) 125

SSC Phase-XIV (12th) 19 Sep 2026, Shift-II

Formula: n(A∪B) Passed in at least one = A + B − both

20% failed in both, so 80% passed in at least one subject.

Passed in both = 70% + 55% − 80% = 45%.

Passed in Arithmetic only = 70% − 45% = 25%, and this is 125. So the total number of students is 500.

Now, 'failed in Reasoning only' means failed in Reasoning but passed in Arithmetic. That is the same group as 'passed in Arithmetic only', so the answer is **125**.

Examiner's Trap Both phrases describe the same group. You don't need a separate calculation for it.

11 ANSWER (b) 5%

SSC Phase-XIV (12th) 22 Sep 2026, Shift-II

Formula: Error % Error % = (Error ÷ True value) × 100

Error = 126 − 120 = 6 km. The base is always the true value, which is 120 km.

Error % = $\frac{6}{120} \times 100 = 5\%$, so the answer is **5%**.

Examiner's Trap If you take 126 as the base, you get about 4.76%. Remember, error % is always calculated on the true (actual) value.

12 ANSWER (c) Rs. 25,250

SSC Phase-XIV (12th) 23 Sep 2026, Shift-II

Let the total sales = S. Commission = 0.075S and bonus = 0.005(S − 20000).

$0.075S + 0.005S - 100 = 1920$

$0.08S = 2020$, so S = 25250.

The total sales were **Rs. 25,250**.

Examiner's Trap The bonus is not on the full sales, only on the part above Rs20,000. If you apply 8% on the full sales you get 24,000, which is not even in the options.

13 ANSWER (c) 4%

SSC Phase-XIV (12th) 25 Sep 2026, Shift-II

The correct time is 2 hours 30 minutes, which is 150 minutes. The estimate was 156 minutes, so the error is 6 minutes.

Error % = $\frac{6}{150} \times 100 = 4\%$. The correct option is **4%**.

14 **ANSWER (c)** 130

SSC Phase-XIV (Matric) 17 Sep 2026, Shift-III

35% are girls, so 65% are boys.

65% of 200 = **130** boys.

15 **ANSWER (c)** 15%

SSC Phase-XIV (Matric) 17 Sep 2026, Shift-III

Formula: % Increase % Increase = (Increase ÷ Initial value) × 100

Increase = 920 − 800 = 120. Here the base is 800.

$\frac{120}{800} \times 100 = 15\%$, which is an increase of **15%**.

16 **ANSWER (b)** Rs. 27,000

SSC Phase-XIV (Matric) 19 Sep 2026, Shift-III

Formula: Successive Change Net change = $a + b + \frac{ab}{100}$ %

Here a = 20, b = −10.

$20 - 10 + \frac{20 \times (-10)}{100}$ = 8% increase.

Final salary = 108% of 25000 = 27000. So the answer comes to **Rs. 27,000**.

Examiner's Trap Taking 20% − 10% = 10% and ticking Rs. 27,500 is wrong. The second change is applied on the increased salary, not on the original salary.

17 **ANSWER (b)** 4

SSC Phase-XIV (Matric) 21 Sep 2026, Shift-III

Let the number = x. The question says $0.6x = 2\frac{2}{5} = \frac{12}{5}$.

$x = \frac{12}{5} \div \frac{3}{5} = \frac{12}{5} \times \frac{5}{3} = 4$

The number is **4**.

18 **ANSWER (c)** Rs. 1200

SSC Phase-XIV (Matric) 23 Sep 2026, Shift-III

After a 25% decrease, the price left is 75% of the original price, that is $\frac{3}{4}$.

$\frac{3}{4}\times$ Original price = 900

Original price = $900 \times \frac{4}{3} = 1200$, so it is **Rs. 1200**.

Examiner's Trap In the exam, students often add 25% of 900 (225) to 900 and mark Rs. 1125. That is wrong, because the decrease was on the original price, not on 900.

19 **ANSWER (d)** Rs40.04

SSC Phase-XIV (Matric) 23 Sep 2026, Shift-III

First it increases by $\frac{1}{10}$: $45.50 \times \frac{11}{10} = 50.05$.

Then it decreases by 0.2, that is 20%:

$50.05 \times 0.8 = 40.04$.

Final value is **Rs40.04**.

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06 CHAPTER
Ratio & Proportion

Questions *19 questions · 14 shifts*

Ratio & Proportion

Directions (Q. 01–19): *Choose the correct answer from the four given options.*

01 Two numbers are in the ratio 5: 9. When 4 is subtracted from the first number and 6 is added to the second number, the resulting ratio becomes 1: 2. Find the sum of the original numbers.

SSC Phase-XIV (Graduation) 17 Sep 2026, Shift-I

(a) 152 (b) 138 (c) 184 (d) 196

02 If $p:q:r=1:3:4$ and $2p+q+3r=51$, then find the value of r.

SSC Phase-XIV (Graduation) 19 Sep 2026, Shift-I

(a) 20 (b) 16 (c) 24 (d) 12

03 If $a:b:c=1:2:3$ and $3a+2b+c=30$, then find the value of c.

SSC Phase-XIV (Graduation) 22 Sep 2026, Shift-I

(a) 12 (b) 9 (c) 17 (d) 6

04 In a mixture, the ratio of juice and water is 2 : 3. What is the percentage of juice in the mixture?

SSC Phase-XIV (Graduation) 24 Sep 2026, Shift-I

(a) 55% (b) 40% (c) 25% (d) 60%

05 If $x:y:z=5:6:7$ and $3x-2y+z=40$, then the value of z is:

SSC Phase-XIV (12th) 19 Sep 2026, Shift-II

(a) 14 (b) 22 (c) 28 (d) 18

06 If $P_1:P_2=3:5$ and $P_1:P_3=2:7$, then what is $P_2:P_3$?

SSC Phase-XIV (12th) 23 Sep 2026, Shift-II

(a) 11:19 (b) 10:21 (c) 10:13 (d) 20:21

07 For a school event, the ratio of boys to girls is 7:9. After 14 boys leave, the ratio becomes 2:3. How many girls were there initially?

SSC Phase-XIV (Matric) 16 Sep 2026, Shift-III

(a) 108 (b) 114 (c) 120 (d) 126

08 The scale of a map is 1:50000. If the distance between two cities on the map is 3.6 cm, what is the actual distance between the cities?

SSC Phase-XIV (Matric) 18 Sep 2026, Shift-III

(a) 1.2 km (b) 1.5 km (c) 1.8 km (d) 2 km

09 If 20 persons consume 240 litres of water in 6 days, how much water will 25 persons consume in 8 days?

SSC Phase-XIV (Matric) 19 Sep 2026, Shift-III

(a) 360 L (b) 400 L (c) 420 L (d) 450 L

10 If $a:b=2:3$, $b:c=4:5$ and $c:d=6:7$, then find $a:d$.

SSC Phase-XIV (Matric) 19 Sep 2026, Shift-III

(a) 14 : 23 (b) 16 : 35 (c) 11 : 25 (d) 12 : 19

11 The sides of a triangle are in the ratio 3 : 4 : 5. If its perimeter is 96 cm, what is the length of the longest side?

SSC Phase-XIV (Matric) 21 Sep 2026, Shift-III

(a) 24 cm (b) 30 cm (c) 36 cm (d) 40 cm

12 The ratio of the volumes of two spheres is 27 : 125. If the radius of the smaller sphere is 9 cm,

what is the radius of the larger sphere?

SSC Phase-XIV (Matric) 21 Sep 2026, Shift-III

(a) 12 cm (b) 15 cm (c) 18 cm (d) 21 cm

13 The third proportional to x and $(x+100)$ is 405. If $x>100$, then find the value of x.

SSC Phase-XIV (Matric) 22 Sep 2026, Shift-III

(a) 125 (b) 150 (c) 80 (d) 225

14 The ratio of two numbers is 4: 7. If 8 is added to both the numbers, the new ratio becomes 2: 3. Find the original numbers.

SSC Phase-XIV (Matric) 23 Sep 2026, Shift-III

(a) 8 and 12 (b) 16 and 28
(c) 12 and 14 (d) 14 and 16

15 The ratio of the incomes of A and B is 3: 4 and the ratio of their expenditures is 2: 3. If each saves 3,000, what is the income of A?

SSC Phase-XIV (Matric) 24 Sep 2026, Shift-III

(a) Rs10000 (b) Rs9000
(c) Rs6000 (d) Rs7000

16 If x is inversely proportional to y and $x=2$ when $y=6$, then what will be the value of y when $x=3$?

SSC Phase-XIV (Matric) 24 Sep 2026, Shift-III

(a) 3 (b) 5 (c) 4 (d) 6

17 A is inversely proportional to the product of B and C. When $B=9$ and $C=5$, $A=12$. What will be the value of A when $B=15$ and $C=4$?

SSC Phase-XIV (Matric) 24 Sep 2026, Shift-III

(a) 8 (b) 4 (c) 5 (d) 9

18 A bag contains coins of 25 paise, 10 paise and 5 paise in the ratio 1: 2: 3. If the total value of all the coins in the bag is Rs. 30, find the number of 5 paise coins.

SSC Phase-XIV (Matric) 25 Sep 2026, Shift-III

(a) 120 (b) 150 (c) 180 (d) 200

19 M is inversely proportional to (N^2+3). If $M=3$ when $N=3$, then what will be the value of M when $N^2=69$?

SSC Phase-XIV (Matric) 25 Sep 2026, Shift-III

(a) 0.5 (b) 1.6 (c) 0.75 (d) 1.95

Answer Key *SSC official key*

Ratio & Proportion (Q. 01–19)

01	(d)	02	(d)	03	(b)	04	(b)	05	(c)	06	(b)	07	(d)	08	(c)	09	(b)	10	(b)
11	(d)	12	(b)	13	(a)	14	(b)	15	(b)	16	(c)	17	(d)	18	(b)	19	(a)		

Detailed Explanations रटना बंद, समझना शुरू

Ratio & Proportion

01 ANSWER (d) 196

SSC Phase-XIV (Graduation) 17 Sep 2026, Shift-I

Let the numbers be 5k and 9k. From the condition: $\frac{5k-4}{9k+6}=\frac{1}{2}$.

Cross multiply: $10k-8=9k+6$, so k = 14. The numbers are 70 and 126.

Sum = 14k = 14 × 14 = **196**.

Short Trick The sum is 14k, so it must be divisible by 14. Among the options, only 196 (= 14 × 14) is a multiple of 14. Direct answer.

02 ANSWER (d) 12

SSC Phase-XIV (Graduation) 19 Sep 2026, Shift-I

Let p = k, q = 3k, r = 4k.

Substituting: $2k+3k+12k=17k=51$, so k = 3.

r = 4k = 4 × 3 = **12**.

03 ANSWER (b) 9

SSC Phase-XIV (Graduation) 22 Sep 2026, Shift-I

First take a = k, b = 2k, c = 3k.

From $3k+4k+3k=10k=30$, k = 3.
So c = 3k = **9**.

04 **ANSWER (b)** 40%

SSC Phase-XIV (Graduation) 24 Sep 2026, Shift-I

Juice is 2 parts and water is 3 parts. Total 5 parts.

Juice % = $\frac{2}{5}\times 100=40\%$. The answer is **40%**.

Examiner's Trap Taking $\frac{2}{3}$ (juice/water) is wrong. The percentage is always worked out on the whole mixture.

05 **ANSWER (c)** 28

SSC Phase-XIV (12th) 19 Sep 2026, Shift-II

Put x = 5k, y = 6k, z = 7k.

$15k-12k+7k=10k=40$, so k = 4.

Now z = 7k = 7 × 4, which is **28**.

06 **ANSWER (b)** 10:21

SSC Phase-XIV (12th) 23 Sep 2026, Shift-II

P_1 is common to both ratios. Let us make it equal. The LCM of 3 and 2 = 6.

$P_1 : P_2 = 6 : 10$
$P_1 : P_3 = 6 : 21$

So $P_2 : P_3$ = **10:21**.

Short Trick Direct method: $\frac{P_2}{P_3}=\frac{5}{3}\times\frac{2}{7}=\frac{10}{21}$.

07 **ANSWER (d)** 126

SSC Phase-XIV (Matric) 16 Sep 2026, Shift-III

Boys = 7k, girls = 9k. Note that the number of girls does not change here.

$\frac{7k-14}{9k}=\frac{2}{3}$
$21k-42=18k$, so k = 14.

Girls = 9k = 9 × 14 = **126**.

Short Trick Keep the girls' share fixed: 7:9 and 2:3 = 6:9. The boys lost 1 part, so 1 part = 14. Girls = 9 × 14 = 126.

08 **ANSWER (c)** 1.8 km

SSC Phase-XIV (Matric) 18 Sep 2026, Shift-III

1 cm on the map means 50000 cm in reality, which is 0.5 km.

So 3.6 cm = 3.6 × 0.5 = **1.8 km**.

09 **ANSWER (b)** 400 L

SSC Phase-XIV (Matric) 19 Sep 2026, Shift-III

Concept: Proportion Water ∝ Persons × Days

First find the water used by one person in one day: $\frac{240}{20\times 6}=2$ litres.

Now for 25 persons and 8 days: $25\times 8\times 2=400$ litres. The correct option is **400 L**.

10 **ANSWER (b)** 16 : 35

SSC Phase-XIV (Matric) 19 Sep 2026, Shift-III

Formula: Chain Ratio $\frac{a}{d}=\frac{a}{b}\times\frac{b}{c}\times\frac{c}{d}$

$\frac{a}{d}=\frac{2}{3}\times\frac{4}{5}\times\frac{6}{7}=\frac{48}{105}$

Dividing by 3 gives $\frac{16}{35}$. That means a : d = **16 : 35**.

11 **ANSWER (d)** 40 cm

SSC Phase-XIV (Matric) 21 Sep 2026, Shift-III

Sides are 3k, 4k, 5k. Perimeter = 12k = 96, so k = 8.

The longest side is 5k, which is 5 × 8 = **40 cm**.

12 **ANSWER (b)** 15 cm

SSC Phase-XIV (Matric) 21 Sep 2026, Shift-III

Concept: Volume ∝ r³ The volume of a sphere is $\frac{4}{3}\pi r^3$, so the ratio of radii = cube root of the ratio of volumes

Ratio of radii = $\sqrt[3]{27}:\sqrt[3]{125}=3:5$.

3 parts of the smaller radius = 9 cm, so 1 part = 3 cm.
Larger radius = 5 × 3 = **15 cm**.

13 **ANSWER (a)** 125

SSC Phase-XIV (Matric) 22 Sep 2026, Shift-III

Formula: Third Proportional Third proportional to a and

$b = \frac{b^2}{a}$

$\frac{(x+100)^2}{x} = 405$

$x^2 + 200x + 10000 = 405x$

$x^2 - 205x + 10000 = 0$

Factorise: $(x-125)(x-80) = 0$, so x = 125 or 80. The condition is x > 100, so x = **125**.

Short Trick Don't get stuck in the quadratic. Just put in an option: at x = 125, $\frac{225^2}{125} = \frac{50625}{125} = 405$ ✔

14 ANSWER (b) 16 and 28

SSC Phase-XIV (Matric) 23 Sep 2026, Shift-III

The numbers are 4k and 7k. Adding 8 to both:
$\frac{4k+8}{7k+8} = \frac{2}{3}$.

$12k + 24 = 14k + 16$, so k = 4. The numbers are **16 and 28**.

Short Trick Among the options, only 16 and 28 are in the ratio 4 : 7. No calculation is needed at all.

15 ANSWER (b) Rs9000

SSC Phase-XIV (Matric) 24 Sep 2026, Shift-III

Let the incomes be 3k, 4k and the expenditures be 2m, 3m. Both save 3000:
$3k - 2m = 3000$ ...(i), $4k - 3m = 3000$ ...(ii)

To remove m, do (i) × 3 − (ii) × 2:
$9k - 8k = 9000 - 6000$, so k = 3000.

A's income = 3k = **Rs9000**.

Short Trick When the savings are equal, this formula works directly: k = $\frac{3000 \times (3-2)}{3 \times 3 - 4 \times 2} = 3000$. Then A's income = 3k = 9000.

16 ANSWER (c) 4

SSC Phase-XIV (Matric) 24 Sep 2026, Shift-III

Concept: Inverse Proportion $x \propto \frac{1}{y}$, so xy = constant

xy = 2 × 6 = 12. Now at x = 3, y = $\frac{12}{3} = 4$.
So y = **4**.

17 ANSWER (d) 9

SSC Phase-XIV (Matric) 24 Sep 2026, Shift-III

Concept: Inverse Proportion $A \propto \frac{1}{BC}$, which means ABC = constant

From the first case: ABC = 12 × 9 × 5 = 540.

New case: A × 15 × 4 = 540, so A = $\frac{540}{60} = 9$.
That gives A = **9**.

18 ANSWER (b) 150

SSC Phase-XIV (Matric) 25 Sep 2026, Shift-III

Concept: Value of Coins Value = Number of coins × Value of one coin

Let the numbers of coins be x, 2x, 3x. Total value = 25x + 20x + 15x = 60x paise.

₹30 = 3000 paise. So 60x = 3000, x = 50.

There are 3x coins of 5 paise, which is 3 × 50 = **150**.

Examiner's Trap If you solve without converting ₹30 into paise (3000), the answer will be wrong. Always keep the units the same.

19 ANSWER (a) 0.5

SSC Phase-XIV (Matric) 25 Sep 2026, Shift-III

Concept: Inverse Proportion $M \propto \frac{1}{N^2+3}$, so $M(N^2+3)$ = constant

At N = 3, $N^2 + 3 = 12$. Constant = 3 × 12 = 36.

Now $N^2 = 69$, so $N^2 + 3 = 72$.
M = $\frac{36}{72}$ = **0.5**.

07 CHAPTER
Profit & Loss

Questions *25 questions · 20 shifts*

Profit & Loss

Directions (Q. 01–25): *Choose the correct answer from the four given options.*

01 Given that the cost price of 20 articles is equal to the selling price of x articles, and the profit percentage is 25%, find the value of x.

SSC Phase-XIV (Graduation) 17 Sep 2026, Shift-I

(a) 14 (b) 16 (c) 12 (d) 18

02 A shopkeeper bought 5 watches for Rs6000. He sold each for Rs1100.
Find the overall profit or loss percentage.

SSC Phase-XIV (Graduation) 18 Sep 2026, Shift-I

(a) 8% loss (b) 8.33% loss
(c) 7.5% loss (d) 6.67% loss

03 A cloth merchant invested Rs1,00,000 to clear his stock during the festive season: half in designer sarees (sold at 20% profit) and half in casual wear (sold at 10% loss). What was his overall percentage profit or loss?

SSC Phase-XIV (Graduation) 18 Sep 2026, Shift-I

(a) 2.5% loss (b) No profit no loss
(c) 5% profit (d) 7.5% profit

04 A manufacturer sells an article to a wholesaler at a profit of 10%. The wholesaler sells it to a retailer at a profit of 20%. If the retailer pays Rs1,320 for it, find the cost price for the manufacturer.

SSC Phase-XIV (Graduation) 19 Sep 2026, Shift-I

(a) Rs2000 (b) Rs1000 (c) Rs3000 (d) Rs4000

05 Two articles were sold at Rs500 each. One at a 25% profit, the other at a 25% loss.
What is the overall result?

SSC Phase-XIV (Graduation) 21 Sep 2026, Shift-I

(a) 5% loss (b) 6.25% loss
(c) 7.5% loss (d) 10% loss

06 A pharmacy earns a 25% profit on the marked price after giving a discount of 20%. If the marked price is Rs400, what is the cost price?

SSC Phase-XIV (Graduation) 21 Sep 2026, Shift-I

(a) Rs250 (b) Rs256 (c) Rs260 (d) Rs270

07 By selling a toy at a certain price, a trader makes a profit of 10%. If he increases the price by Rs. 4, his profit becomes 12.5%. Find the cost price of the toy.

SSC Phase-XIV (Graduation) 22 Sep 2026, Shift-I

(a) Rs180 (b) Rs140 (c) Rs160 (d) Rs120

08 A shopkeeper buys 220 articles but pays for only 198 articles at the marked price. He sells each article at a discount of 5%. Find his approximate profit percentage.

SSC Phase-XIV (Graduation) 22 Sep 2026, Shift-I

(a) 7% (b) 10% (c) 6% (d) 11%

09 A bookstore sells half of its books at a profit of 20% and the rest at a loss of 10%. Overall, it makes a profit of Rs200 on a lot of books worth Rs4000. What is the total selling price?

SSC Phase-XIV (Graduation) 23 Sep 2026, Shift-I

(a) Rs4,150 (b) Rs4,200 (c) Rs4,250 (d) Rs4,300

10 A dealer claims to sell goods at cost price but uses a weight of 960 grams instead of a standard kilogram. Find the approximate percentage profit earned by the dealer.

SSC Phase-XIV (Graduation) 24 Sep 2026, Shift-I

(a) 5.18% (b) 6.78% (c) 7.42% (d) 4.17%

11 A shopkeeper earns a profit of 19% on the cost price of an article after giving three successive discounts of 11%, 13% and 15% to a customer. If the shopkeeper had given only the discounts of 11% and 13%, what would the profit percentage have been?

SSC Phase-XIV (Graduation) 24 Sep 2026, Shift-I

(a) 35% (b) 40% (c) 45% (d) 50%

12 A seller gives a discount of 20% and still earns a profit of 25%. If the profit earned is Rs75, find the marked price of the article.

SSC Phase-XIV (Graduation) 24 Sep 2026, Shift-I

(a) Rs504.25 (b) Rs468.75
(c) Rs490 (d) Rs570

13 A home decor exporter shipped a delicate mirror set of unknown value. During international transit, a part of the packaging got damaged, which required a repacking cost of Rs500. The buyer agreed to pay 20,000, and the seller claimed a 25% profit on his total investment, including the repacking cost. What was the original cost of the goods before repacking?

SSC Phase-XIV (Graduation) 25 Sep 2026, Shift-I

(a) Rs15,000 (b) 15,500
(c) Rs16,000 (d) Rs16,500

14 The cost price of two articles A and B is the same. Article A is sold at a loss of 30% and article B is sold for Rs. 2,300 more than the selling price of A. If the overall profit on selling both articles together is 16%, what is the selling price of article B?

SSC Phase-XIV (12th) 19 Sep 2026, Shift-II

(a) Rs. 5,400 (b) Rs. 4,250
(c) Rs. 4,050 (d) Rs. 4,500

15 A seller deals in three different articles named A, B and C. Each of these gives a different percentage profit on sale: article A gives him 18% profit, article B gives him 32% profit and article C gives him 35% profit. When the seller takes only articles A and C together, the overall profit percentage from these two comes to 27%. Further, when he takes all three articles A, B and C together, the overall profit percentage becomes 29%. It is also given that the total number of articles sold, including A, B and C, is 170. Find how many articles of type A were sold.

SSC Phase-XIV (12th) 21 Sep 2026, Shift-II

(a) 68 (b) 48 (c) 54 (d) 50

16 After a discount of 20%, the price of an article is Rs. 36,800. If no discount is given, the shopkeeper makes a profit of 15%. Find the cost price of the article.

SSC Phase-XIV (12th) 24 Sep 2026, Shift-II

(a) Rs. 42,000 (b) Rs. 45,000
(c) Rs. 40,000 (d) Rs. 41,500

17 A shopkeeper marks the price of an article in such a way that even after giving a discount of 20%, he makes a profit of k%. If the cost price and marked price of the article are Rs4,400 and Rs6,500 respectively, what is the value of k?

SSC Phase-XIV (12th) 26 Sep 2026, Shift-I

(a) 25% (b) 16.25% (c) 18.18% (d) 14.75%

18 A trader marks the price of an article in such a way that even after giving a discount of 10%, he makes a profit of 8% on the cost price of Rs. 1500. What is the marked price?

SSC Phase-XIV (Matric) 16 Sep 2026, Shift-III

(a) Rs. 1700 (b) Rs. 1760
(c) Rs. 1800 (d) Rs. 1860

19 A bookseller sells a guidebook for Rs690 at a loss of 8%. Find the selling price required to earn a profit of 15% on the same book.

SSC Phase-XIV (Matric) 18 Sep 2026, Shift-III

(a) Rs805 (b) Rs825
(c) Rs845 (d) Rs862.50

20 A shopkeeper gives a discount of 25% on the marked price of an article. What price should be marked on an article costing Rs600 so as to make a profit of 20%?

SSC Phase-XIV (Matric) 19 Sep 2026, Shift-III

(a) Rs1,000 (b) Rs960 (c) Rs1,050 (d) Rs900

21 A trader sold an article at a profit of 25%. If he had sold it for Rs. 120 less, he would have made a profit of only 10%. What was the cost price?

SSC Phase-XIV (Matric) 21 Sep 2026, Shift-III

(a) Rs. 720 (b) Rs. 800 (c) Rs. 840 (d) Rs. 960

22 An article is sold for Rs855 at a loss of 5%. At what price should it be sold to gain a profit of 14%?

SSC Phase-XIV (Matric) 22 Sep 2026, Shift-III

(a) Rs. 990 (b) Rs. 1007
(c) Rs. 1026 (d) Rs. 1035

23 A manufacturer sells a machine to a wholesaler with a profit margin of 10%. The wholesaler later sells the machine to a retailer, earning a profit of 20%. The retailer finds that the machine is slightly damaged and, as a result, sells it to a customer at a loss of 5% for Rs25,080. Find the original manufacturing cost of the machine.

SSC Phase-XIV (Matric) 23 Sep 2026, Shift-III

(a) Rs40,000 (b) Rs60,000
(c) Rs80,000 (d) Rs20,000

24 A shopkeeper sells two calculators for Rs. 1200 each. On one he makes a profit of 20% and on the other he suffers a loss of 20%. What is his overall profit or loss?

SSC Phase-XIV (Matric) 24 Sep 2026, Shift-III

(a) Profit of Rs. 80 (b) Loss of Rs. 100
(c) Profit of Rs. 120 (d) Loss of Rs. 120

25 A shopkeeper marks his goods 40% above the cost price. He gives a discount of 10% to all customers. For people with a \"Member Card\", he gives an additional discount of 5% on the already reduced price. If a member buys an article for Rs2,394, what was its original cost price?

SSC Phase-XIV (Matric) 25 Sep 2026, Shift-III

(a) Rs3,000 (b) Rs4,000 (c) Rs2,000 (d) Rs5,000

Answer Key *SSC official key*

Profit & Loss (Q. 01–25)

01	(b)	02	(b)	03	(c)	04	(b)	05	(b)	06	(b)	07	(c)	08	(c)	09	(b)	10	(d)
11	(b)	12	(b)	13	(b)	14	(c)	15	(b)	16	(c)	17	(c)	18	(c)	19	(d)	20	(b)
21	(b)	22	(c)	23	(d)	24	(b)	25	(c)										

Detailed Explanations रटना बंद, समझना शुरू

Profit & Loss

01 ANSWER (b) 16

SSC Phase-XIV (Graduation) 17 Sep 2026, Shift-I

Concept: CP/SP of Articles $n \times CP = m \times SP$, that is $\frac{SP}{CP} = \frac{n}{m}$

A 25% profit means SP : CP = 125 : 100 = 5 : 4.

$20 \times CP = x \times SP$, so $\frac{20}{x} = \frac{5}{4}$ and x = **16**.

02 ANSWER (b) 8.33% loss

SSC Phase-XIV (Graduation) 18 Sep 2026, Shift-I

Cost price of one watch = $\frac{6000}{5}$ = 1200. He sold it for 1100, so there is a loss of 100 on each watch.

Loss % = $\frac{100}{1200} \times 100 = 8\frac{1}{3}\% \approx 8.33\%$.
So the option **8.33% loss** is correct.

03 ANSWER (c) 5% profit

SSC Phase-XIV (Graduation) 18 Sep 2026, Shift-I

Concept: Equal Investment When the money in both

parts is equal, the overall profit % is simply the average of the two percentages.

Half of 1,00,000 means ₹50,000 in sarees and ₹50,000 in casual wear.
20% profit on sarees = ₹10,000. 10% loss on casual wear = ₹5,000.

Net profit = 10,000 − 5,000 = ₹5,000
Profit % = $\frac{5000}{100000} \times 100 = 5\%$, that is, **5% profit**.

Short Trick The investment is equal, so just take the plain average: $\frac{(+20)+(-10)}{2} = +5\%$, which means 5% profit.

04 ANSWER (b) Rs1000

SSC Phase-XIV (Graduation) 19 Sep 2026, Shift-I

Concept: Successive Profit Final price = Initial CP × first multiplier × second multiplier

Let the manufacturer's CP be ₹x.
The wholesaler paid $1.1x$, and the retailer paid $1.2 \times 1.1x = 1.32x$.

$1.32x = 1320 \Rightarrow x = 1000$
So the manufacturer's cost comes to **Rs1000**.

Short Trick Think in fractions: $\frac{11}{10} \times \frac{6}{5} = \frac{66}{50}$, so CP = $1320 \times \frac{50}{66} = 1000$.

05 ANSWER (b) 6.25% loss

SSC Phase-XIV (Graduation) 21 Sep 2026, Shift-I

Rule: Same SP, x% Gain/Loss If the SP of both is equal and there is x% profit on one and x% loss on the other, the result is always a loss = $\frac{x^2}{100}\%$

CP of the first article = $\frac{500}{1.25} = 400$.
CP of the second = $\frac{500}{0.75} = \frac{2000}{3} \approx 666.67$.

Total CP = $400 + \frac{2000}{3} = \frac{3200}{3}$, and total SP = ₹1000.
Loss = $\frac{3200}{3} - 1000 = \frac{200}{3}$
Loss % = $\frac{200/3}{3200/3} \times 100 = 6.25\%$, that is, **6.25% loss**.

Short Trick One line with the formula: $\frac{25^2}{100} = 6.25\%$ loss.

Examiner's Trap Many students think the 25% profit and 25% loss cancel out and give \"no profit no loss\". That is not true. When the SP is the same, there is always a loss.

06 ANSWER (b) Rs256

SSC Phase-XIV (Graduation) 21 Sep 2026, Shift-I

Formula: SP SP = MP × (1 − Discount%) = CP × (1 + Profit%)

First find the SP: 80% of 400 = ₹320.

This is at 25% profit, so $CP = \frac{320}{1.25} = 256$.
The cost price is **Rs256**.

Examiner's Trap Reading \"25% profit on the marked price\", many students apply the profit on 400. Remember, profit is always calculated on the CP. So divide 320 by 1.25.

07 ANSWER (c) Rs160

SSC Phase-XIV (Graduation) 22 Sep 2026, Shift-I

Concept: Change in Profit % The change in SP equals the change in profit % taken on the CP.

Profit went from 10% to 12.5%. So 2.5% of the CP was added, and that is ₹4.
CP = $\frac{4 \times 100}{2.5} = 160$, so the CP of the toy is **Rs160**.

08 ANSWER (c) 6%

SSC Phase-XIV (Graduation) 22 Sep 2026, Shift-I

Formula: Profit % Profit % = $\frac{SP - CP}{CP} \times 100$

Let the MP of each article be ₹1. For 220 articles he paid only ₹198.
He gave a 5% discount while selling, so sales = $220 \times 0.95 = 209$.

Profit = 209 − 198 = ₹11
Profit % = $\frac{11}{198} \times 100 \approx 5.56\%$
The question asks for the \"approximate\" profit, so we take the nearest option, **6%**.

Short Trick Taking MP = ₹1 gives the totals 198 and 209 directly. No trouble with decimals at all.

09 ANSWER (b) Rs4,200

SSC Phase-XIV (Graduation) 23 Sep 2026, Shift-I

Formula: SP Total SP = Total CP + Total profit

CP of the books = ₹4000 and profit = ₹200. So total SP = 4000 + 200 = **Rs4,200**.

Let us check it too: 120% of 2000 = 2400 and 90% of

2000 = 1800. Add them and you get 4200 ✓

10 **ANSWER (d)** 4.17%

SSC Phase-XIV (Graduation) 24 Sep 2026, Shift-I

Rule: False Weight Profit % = (Shortfall ÷ Weight actually given) × 100

The dealer charges for 1000 grams but gives only 960 grams. He saves 40 grams on every kg.

Profit % = $\frac{40}{960} \times 100 = \frac{25}{6} \approx 4.17\%$
So the answer comes to **4.17%**.

Examiner's Trap Do not divide by 1000 here and write 4%. Always divide by the weight that is actually given, that is, 960.

11 **ANSWER (b)** 40%

SSC Phase-XIV (Graduation) 24 Sep 2026, Shift-I

Concept: SP by Ratio New SP ÷ Old SP = New multiplier ÷ Old multiplier

Note that the 11% and 13% discounts are there both times. Only the 15% one is removed. So the SP becomes $\frac{1}{0.85}$ times.

Earlier SP = 1.19 CP. Now the new SP = $\frac{1.19}{0.85} CP = 1.4\ CP$
This means the profit becomes **40%**.

Short Trick No need to multiply out 11% and 13% at all. Just look at the effect of the discount that was removed: $119 \div 85 = 1.4$.

12 **ANSWER (b)** Rs468.75

SSC Phase-XIV (Graduation) 24 Sep 2026, Shift-I

Formula: MP MP = SP ÷ (1 − Discount%)

25% of CP = ₹75, so CP = ₹300. SP = 300 + 75 = ₹375.

This SP is 80% of the MP: $MP = \frac{375}{0.8} = 468.75$
The marked price is **Rs468.75**.

13 **ANSWER (b)** 15,500

SSC Phase-XIV (Graduation) 25 Sep 2026, Shift-I

Formula: CP Total investment = SP ÷ (1 + Profit%)

With 25% profit on the whole investment, the SP received was ₹20,000.

So total investment = $\frac{20000}{1.25} = 16000$.

This includes the ₹500 spent on repacking. Actual cost = 16000 − 500 = **15,500**.

Examiner's Trap Stopping at 16,000 is a mistake. That is the total spend including packing, not the original cost of the mirror set.

14 **ANSWER (c)** Rs. 4,050

SSC Phase-XIV (12th) 19 Sep 2026, Shift-II

Concept: Overall Profit Total SP = Total CP × (1 + Overall profit%)

Let the CP of each be 100x. A was sold at 30% loss, so SP of A = 70x.
The combined profit is 16%, so total SP = 116% of 200x = 232x.

SP of B = 232x − 70x = 162x
SP of B is 2300 more than that of A: 162x − 70x = 92x = 2300, so x = 25.

SP of B = 162 × 25 = **Rs. 4,050**

15 **ANSWER (b)** 48

SSC Phase-XIV (12th) 21 Sep 2026, Shift-II

Concept: Alligation Ratio of quantities = inverse ratio of the distances from the average

First mix A (18%) and C (35%) to get 27%. The distances are 9 and 8, so A : C = 8 : 9, 17 parts in all.
Now the 27% of (A+C) and the 32% of B together give 29%. The distances are 2 and 3, so (A+C) : B = 3 : 2.

Turn 17 parts into a multiple of 3: A+C = 51 (A = 24, C = 27) and B = 34. Total 85.
There are 170 articles, that is, 2 × 85. So A = 24 × 2 = **48**.

Short Trick Apply alligation twice. First for A and C, then for that mixture and B. It is far quicker than forming equations.

16 **ANSWER (c)** Rs. 40,000

SSC Phase-XIV (12th) 24 Sep 2026, Shift-II

Formula: MP MP = SP ÷ (1 − Discount%)

Marked price = $\frac{36800}{0.8} = 46000$

Selling at ₹46,000 without discount gives 15% profit,

so $CP = \frac{46000}{1.15} = 40000$.
The cost price is **Rs. 40,000**.

Short Trick Both steps together:
$CP = \frac{36800}{0.8 \times 1.15} = \frac{36800}{0.92} = 40000$.

17 ANSWER (c) 18.18%

SSC Phase-XIV (12th) 26 Sep 2026, Shift-I

Formula: Profit % Profit % = $\frac{SP - CP}{CP} \times 100$

After 20% discount, SP = 80% of 6500 = ₹5200.
Profit = 5200 − 4400 = ₹800, so
$k = \frac{800}{4400} \times 100 = \frac{200}{11} \approx 18.18\%$.
The value of k is **18.18%**.

18 ANSWER (c) Rs. 1800

SSC Phase-XIV (Matric) 16 Sep 2026, Shift-III

Formula: MP MP × (1 − Discount%) = CP × (1 + Profit%)

He wants 8% profit, so SP = 108% of 1500 = ₹1620.

This is 90% of the MP: $MP = \frac{1620}{0.9} = 1800$
The correct option is **Rs. 1800**.

19 ANSWER (d) Rs862.50

SSC Phase-XIV (Matric) 18 Sep 2026, Shift-III

Concept: Ratio Method New SP = Old SP × (100 + Profit%) ÷ (100 − Loss%)

At 8% loss, the SP is 92% of the CP. 92% = 690, so CP = $\frac{690}{0.92} = 750$.

For 15% profit, SP = 750 × 1.15 = **Rs862.50**

Short Trick Direct method: $690 \times \frac{115}{92} = 862.5$. Both 92 and 115 cancel by 23, so the calculation is easy.

20 ANSWER (b) Rs960

SSC Phase-XIV (Matric) 19 Sep 2026, Shift-III

Formula: MP MP = CP × (1 + Profit%) ÷ (1 − Discount%)

For 20% profit, the SP needed = 600 × 1.2 = ₹720.

After the 25% discount, this 720 must remain, that is, 75% of MP = 720.
$MP = \frac{720}{0.75} = 960$, so the marked price has to be **Rs960**.

21 ANSWER (b) Rs. 800

SSC Phase-XIV (Matric) 21 Sep 2026, Shift-III

Concept: Change in Profit % Change in SP = CP × (change in profit %)

Profit fell from 25% to 10%, which means 15% of the CP was lost. And this fall is ₹120.

15% of CP = ₹120, so CP = $\frac{120 \times 100}{15} = 800$
The cost price was **Rs. 800**.

22 ANSWER (c) Rs. 1026

SSC Phase-XIV (Matric) 22 Sep 2026, Shift-III

Concept: Ratio Method New SP = Old SP × (100 + Profit%) ÷ (100 − Loss%)

It was sold at 5% loss, so 95% of CP = 855. CP = $\frac{855}{0.95} = 900$.
Now, at 14% profit, SP = 900 × 1.14 = **Rs. 1026**

Short Trick $855 \times \frac{114}{95} = 9 \times 114 = 1026$. 855 divides neatly by 95, and that is the beauty of this method.

23 ANSWER (d) Rs20,000

SSC Phase-XIV (Matric) 23 Sep 2026, Shift-III

Concept: Chain Profit/Loss Final SP = Original cost × 1.1 × 1.2 × 0.95

Let the manufacturing cost be ₹M.
Combined multiplier of all three steps = $1.1 \times 1.2 \times 0.95 = 1.254$

$1.254M = 25080 \Rightarrow M = \frac{25080}{1.254} = 20000$
So the machine cost **Rs20,000**.

Short Trick Check from the options: 20000 × 1.254 = 25080 ✓, which matches option D straight away.

24 ANSWER (b) Loss of Rs. 100

SSC Phase-XIV (Matric) 24 Sep 2026, Shift-III

Rule: Same SP, x% Gain/Loss Such questions always give a loss, loss % = $\frac{x^2}{100}\%$

CP of the first calculator = $\frac{1200}{1.2} = 1000$, and CP of the second = $\frac{1200}{0.8} = 1500$.

Total CP = ₹2500 and total SP = ₹2400. The

difference is ₹100, so the result is a **Loss of Rs. 100**.

Short Trick Loss % = $\frac{20^2}{100}$ = 4%, on the total CP. Total SP 2400 = 96% of CP, so CP = 2500 and loss = ₹100.

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25 ANSWER (c) Rs2,000

SSC Phase-XIV (Matric) 25 Sep 2026, Shift-III

Concept: Chain Multipliers Member price = CP × 1.4 × 0.9 × 0.95

Let CP = ₹C. Marked price = 1.4C, and after the 10% discount it is 1.26C.

A further 5% off on the Member Card:
$0.95 \times 1.26C = 1.197C$
$1.197C = 2394 \Rightarrow C = 2000$, so the CP is **Rs2,000**.

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08 CHAPTER
Discount

Questions *31 questions · 20 shifts*

Discount

Directions (Q. 01–31): *Choose the correct answer from the four given options.*

01 An article with a marked price of Rsx was sold for Rs4,400 after a discount of 12%. Find the value of x.

SSC Phase-XIV (Graduation) 17 Sep 2026, Shift-I

(a) Rs7000 (b) Rs6500 (c) Rs5000 (d) Rs5600

02 The marked price of a box of paneer is Rs1050 and a discount of 11% is given on it. The marked price of a box of butter is Rs1750 and a discount of 32% is given on it. If a customer buys 5 boxes of paneer and 4 boxes of butter, find the overall effective discount percentage on the total purchase.

SSC Phase-XIV (Graduation) 17 Sep 2026, Shift-I

(a) 18% (b) 23% (c) 28% (d) 33%

03 A product is sold for Rs8,800 after a discount of 20% on its marked price y. Find y.

SSC Phase-XIV (Graduation) 19 Sep 2026, Shift-I

(a) Rs22,000 (b) Rs17,000
(c) Rs11,000 (d) Rs35,000

04 A shopkeeper marks Rs1200 on a shirt and gives a discount of 15%. He marks Rs2000 on a pair of trousers and gives a discount of 25%. If a customer buys 3 shirts and 2 pairs of trousers, find the approximate total discount percentage on the total purchase.

SSC Phase-XIV (Graduation) 19 Sep 2026, Shift-I

(a) 18.56% (b) 20.26% (c) 23.95% (d) 25.56%

05 One saree is bought for Rs644 after a discount of 8%, and another saree is bought for Rs594 after a discount of 1%. If both sarees are treated as a single transaction, find the approximate overall discount percentage on the total marked price.

SSC Phase-XIV (Graduation) 22 Sep 2026, Shift-I

(a) 4.13% (b) 5.07% (c) 4.77% (d) 5.50%

06 The marked price of a combo pack is Rs500. A discount of 10% is given on each item and an additional discount of 5% is given on the whole combo. Find the total amount paid.

SSC Phase-XIV (Graduation) 25 Sep 2026, Shift-I

(a) Rs425.7 (b) Rs427.5 (c) Rs430 (d) 435Rs

07 Raj buys an article whose marked price is paid partly in cash and the rest through a credit card. On the 30% paid in cash he gets a discount of 35%, while a surcharge of 3% is charged on the 70% paid by credit card. If he finally pays a total of Rs9,160, find the marked price of the article.

SSC Phase-XIV (12th) 16 Sep 2026, Shift-II

(a) Rs7,500 (b) Rs8,500
(c) Rs9,000 (d) Rs10,000

08 A shopkeeper sold an article at successive discounts of 20% and 30%. Find the total discount percentage.

SSC Phase-XIV (12th) 17 Sep 2026, Shift-II

(a) 25% (b) 44% (c) 50% (d) 62%

09 Find the single equivalent discount for successive discounts of 20%, 25% and 50% on the marked price of a laptop.

SSC Phase-XIV (12th) 18 Sep 2026, Shift-II

(a) 70% (b) 60% (c) 90% (d) 80%

10 After a discount of 25%, the selling price of a mobile set is Rs. 10,600. Approximately what was the marked price?

SSC Phase-XIV (12th) 21 Sep 2026, Shift-II

(a) Rs. 14,345.33 (b) Rs. 15,233.33
(c) Rs. 14,133.33 (d) Rs. 14,233.33

11 Find the single equivalent discount for successive discounts of 10%, 15% and 20% on the marked price of a television.

SSC Phase-XIV (12th) 22 Sep 2026, Shift-II

(a) 54.6% (b) 41.9% (c) 63.2% (d) 38.8%

12 The marked price of an article is Rs3,750. If the shopkeeper offers two successive discounts of k% each on the marked price, it is equal to a single discount of Rs1,104. If he offers only a single discount of K% on the marked price, what will be the new selling price of the article?

SSC Phase-XIV (12th) 23 Sep 2026, Shift-II

(a) Rs. 2,540 (b) Rs. 3,150
(c) Rs. 2,646 (d) Rs. 2,900

13 The original marked price of an article is first increased by 25%. Then two successive discounts of 20% and 5% are given on the increased marked price. If the final selling price is Rs7,600, find the original marked price.

SSC Phase-XIV (12th) 25 Sep 2026, Shift-II

(a) Rs7,600 (b) Rs8,000 (c) Rs8,400 (d) Rs9,000

14 A shopkeeper offers a discount of 15% on a marked price of Rs. 800. What is the selling price?

SSC Phase-XIV (Matric) 16 Sep 2026, Shift-III

(a) Rs. 660 (b) Rs. 680 (c) Rs. 700 (d) Rs. 720

15 An article is sold for Rs. 1728 after two successive discounts of 10% and 20%. What was its marked price?

SSC Phase-XIV (Matric) 16 Sep 2026, Shift-III

(a) Rs. 2200 (b) Rs. 2300
(c) Rs. 2400 (d) Rs. 2500

16 A shopkeeper marks a toy at Rs. 400 and gives a discount of Rs. 60. What is the discount percentage?

SSC Phase-XIV (Matric) 17 Sep 2026, Shift-III

(a) 12% (b) 15% (c) 18% (d) 20%

17 The marked price of a jacket is Rs. 2500. Two successive discounts of 10% and 20% are given. What is the final selling price?

SSC Phase-XIV (Matric) 17 Sep 2026, Shift-III

(a) Rs. 1760 (b) Rs. 1800
(c) Rs. 1820 (d) Rs. 1850

18 A shopkeeper offers a discount of 12% on a marked price of Rs1500. Find the amount of discount.

SSC Phase-XIV (Matric) 18 Sep 2026, Shift-III

(a) Rs160 (b) Rs170 (c) Rs180 (d) Rs190

19 A seller offers a single discount of 30% on an article marked at Rs1500. Another seller offers successive discounts of 20% and 10% on the same marked price. How much more does a customer pay to the second seller?

SSC Phase-XIV (Matric) 18 Sep 2026, Shift-III

(a) Rs20 (b) Rs30 (c) Rs40 (d) Rs50

20 A scheme offers "Buy 3, Get 2 Free" on identical items having the same marked price. Find the effective discount percentage.

SSC Phase-XIV (Matric) 19 Sep 2026, Shift-III

(a) 32% (b) 36% (c) 40% (d) 45%

21 The price of a bag is reduced by 20% from Rs. 1500. What is the reduced price?

SSC Phase-XIV (Matric) 19 Sep 2026, Shift-III

(a) Rs. 1100 (b) Rs. 1150
(c) Rs. 1200 (d) Rs. 1250

22 The marked price of a school bag is Rs. 1250. If it is sold for Rs. 1000, what is the discount percentage?

SSC Phase-XIV (Matric) 21 Sep 2026, Shift-III

(a) 18% (b) 20% (c) 22% (d) 25%

23 An article is marked 25% above its cost price and then sold at a discount of 12% on the marked price. If the cost price is Rs. 800, what is the selling price?

SSC Phase-XIV (Matric) 21 Sep 2026, Shift-III

(a) Rs. 860 (b) Rs. 870 (c) Rs. 880 (d) Rs. 890

24 An article with a marked price of Rs960 is sold after a discount of 25%. What is the selling price?

SSC Phase-XIV (Matric) 22 Sep 2026, Shift-III

(a) Rs. 700 (b) Rs. 720 (c) Rs. 740 (d) Rs. 760

25 A shopkeeper offers two successive discounts of 20% and 5% on an article. If the marked price is Rs2000, what is the total amount of discount?

SSC Phase-XIV (Matric) 22 Sep 2026, Shift-III

(a) Rs. 420 (b) Rs. 460 (c) Rs. 480 (d) Rs. 500

26 A sofa is sold for Rs12,000 after giving a discount of 25%. Find its marked price (in Rs.).

SSC Phase-XIV (Matric) 23 Sep 2026, Shift-III

(a) Rs28,000 (b) Rs23,000
(c) Rs16,000 (d) Rs19,000

27 The marked price of a mobile phone is Rs12,000. A customer bought it for Rs9,180 after two successive discounts. If the first discount is 15%, what is the second discount?

SSC Phase-XIV (Matric) 23 Sep 2026, Shift-III

(a) 10% (b) 17% (c) 13% (d) 18%

28 A pair of shoes is sold for Rs. 1530 after a discount of 10%. What was its marked price?

SSC Phase-XIV (Matric) 24 Sep 2026, Shift-III

(a) Rs. 1600 (b) Rs. 1650
(c) Rs. 1700 (d) Rs. 1750

29 The marked price of a washing machine is Rs. 30,000. During a festival, the seller gives a discount of 5% and then an additional discount of 10% on the reduced price. What is the final selling price?

SSC Phase-XIV (Matric) 24 Sep 2026, Shift-III

(a) Rs. 25,500 (b) Rs. 25,650
(c) Rs. 25,750 (d) Rs. 25,900

30 The marked price of an article is Rs. 2400 and it is sold at a discount of 5%. What is its selling price?

SSC Phase-XIV (Matric) 25 Sep 2026, Shift-III

(a) Rs. 2240 (b) Rs. 2260
(c) Rs. 2280 (d) Rs. 2300

31 A shopkeeper wants to give a discount of 15% on the marked price and still receive Rs. 2040. What should the marked price be?

SSC Phase-XIV (Matric) 25 Sep 2026, Shift-III

(a) Rs. 2200 (b) Rs. 2300
(c) Rs. 2400 (d) Rs. 2500

Answer Key *SSC official key*

Discount (Q. 01–31)

01	(c)	02	(b)	03	(c)	04	(b)	05	(c)	06	(b)	07	(d)	08	(b)	09	(a)	10	(c)
11	(d)	12	(c)	13	(b)	14	(b)	15	(c)	16	(b)	17	(b)	18	(c)	19	(b)	20	(c)
21	(c)	22	(b)	23	(c)	24	(b)	25	(c)	26	(c)	27	(a)	28	(c)	29	(b)	30	(c)
31	(c)																		

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Discount

01 **ANSWER (c)** Rs5000

SSC Phase-XIV (Graduation) 17 Sep 2026, Shift-I

Formula: MP MP = SP ÷ (1 − Discount%)

After a 12% discount, 88% of x is left, which is 4400.
$x = \frac{4400}{0.88} = 5000$, so x = **Rs5000**.

02 **ANSWER (b)** 23%

SSC Phase-XIV (Graduation) 17 Sep 2026, Shift-I

Formula: Effective Discount Effective discount % = (Total discount ÷ Total marked price) × 100

Paneer: MP = 5 × 1050 = ₹5250, discount = 11% of 5250 = ₹577.5
Butter: MP = 4 × 1750 = ₹7000, discount = 32% of 7000 = ₹2240

Total discount = ₹2817.5, total MP = ₹12250
Discount % = $\frac{2817.5}{12250} \times 100 = 23\%$, that is, **23%**.

Examiner's Trap Taking the simple average of 11% and 32% (21.5%) is wrong. The marked prices here, 5250 and 7000, are different, so only a weighted average works.

03 **ANSWER (c)** Rs11,000

SSC Phase-XIV (Graduation) 19 Sep 2026, Shift-I

Formula: MP MP = SP ÷ (1 − Discount%)

After a 20% discount, 80% of y = 8800.

$y = \frac{8800}{0.8} = 11000$
The marked price was **Rs11,000**.

04 **ANSWER (b)** 20.26%

SSC Phase-XIV (Graduation) 19 Sep 2026, Shift-I

Formula: Effective Discount Effective discount % = (Total discount ÷ Total marked price) × 100

3 shirts: MP = 3 × 1200 = ₹3600, 15% discount = ₹540
2 trousers: MP = 2 × 2000 = ₹4000, 25% discount = ₹1000

Total discount = ₹1540 and total MP = ₹7600.
Discount % = $\frac{1540}{7600} \times 100 \approx 20.26\%$
So the answer works out to **20.26%**.

05 **ANSWER (c)** 4.77%

SSC Phase-XIV (Graduation) 22 Sep 2026, Shift-I

Formula: MP MP = SP ÷ (1 − Discount%)

First find the MP of both.
First saree: $\frac{644}{0.92} = 700$, second saree: $\frac{594}{0.99} = 600$
Total MP = ₹1300 and total paid = 644 + 594 = ₹1238. The discount received is ₹62.
Discount % = $\frac{62}{1300} \times 100 \approx 4.77\%$, that is, **4.77%**.

06 **ANSWER (b)** Rs427.5

SSC Phase-XIV (Graduation) 25 Sep 2026, Shift-I

Rule: Successive Discount Successive discount of a% and b% = $a + b - \frac{ab}{100}$ %

After a 10% discount on each item: 500 × 0.9 = ₹450

Then another 5% on the whole combo: 450 × 0.95 = ₹427.5
The customer will pay **Rs427.5**.

Examiner's Trap Adding 10% + 5% = 15% and writing ₹425 is wrong. The second discount applies to the reduced price, so the total discount is only 14.5%.

07 **ANSWER (d)** Rs10,000

SSC Phase-XIV (12th) 16 Sep 2026, Shift-II

Concept: Split Payment Total payment = Cash part × (1 − Discount) + Card part × (1 + Surcharge)

Let MP = 100 units.
Cash part is 30 units, at 35% discount: 30 × 0.65 = 19.5
Card part is 70 units, with 3% surcharge: 70 × 1.03 = 72.1

Total payment = 91.6 units, which is ₹9160. So 1 unit = ₹100.

MP = 100 × 100 = **Rs10,000**

08 ANSWER (b) 44%

SSC Phase-XIV (12th) 17 Sep 2026, Shift-II

Rule: Successive Discount Successive discount of a% and b% = $a+b-\frac{ab}{100}$ %

$20+30-\frac{20\times30}{100}=50-6=44$, so the total discount is **44%**.

Check: on 100, a 20% discount gives 80, then a 30% discount gives 56. A total of 44 is reduced.

Examiner's Trap Directly adding 20% + 30% = 50% is the most common mistake here. The second discount applies to the reduced price.

09 ANSWER (a) 70%

SSC Phase-XIV (12th) 18 Sep 2026, Shift-II

Concept: Successive Discount Remaining value = (1 − a)(1 − b)(1 − c), and single discount = 1 − remaining

Remaining part = $\frac{4}{5}\times\frac{3}{4}\times\frac{1}{2}=\frac{3}{10}$, that is, 30%.
So the single equivalent discount = 100% − 30% = **70%**.

10 ANSWER (c) Rs. 14,133.33

SSC Phase-XIV (12th) 21 Sep 2026, Shift-II

Formula: MP MP = SP ÷ (1 − Discount%)

After a 25% discount, SP = 75% of MP = $\frac{3}{4}$ MP

$MP=10600\times\frac{4}{3}=\frac{42400}{3}\approx 14133.33$
The marked price was about **Rs. 14,133.33**.

11 ANSWER (d) 38.8%

SSC Phase-XIV (12th) 22 Sep 2026, Shift-II

Rule: Successive Discount Successive discount of a% and b% = $a+b-\frac{ab}{100}$ %

First combine 10% and 15%: $10+15-\frac{150}{100}=23.5\%$

Now 23.5% and 20%:
$23.5+20-\frac{23.5\times20}{100}=43.5-4.7=38.8\%$
The correct option is **38.8%**.

Short Trick A successive discount is always less than the straight sum (45%). So the options 54.6% and 63.2% are out at once.

12 ANSWER (c) Rs. 2,646

SSC Phase-XIV (12th) 23 Sep 2026, Shift-II

Concept: Successive Discount If k% discount is given twice, SP $=MP\times\left(1-\frac{k}{100}\right)^2$

First, find the SP after the two discounts:
$3750-1104=2646$ rupees.

So $3750\times\left(1-\frac{k}{100}\right)^2=2646\Rightarrow\left(1-\frac{k}{100}\right)^2=0.7056$

$1-\frac{k}{100}=0.84\Rightarrow k=16$. Together, the two discounts amount to Rs. 1104, which is $\frac{1104}{3750}\times100=29.44\%$ of the MP. This is the equivalent **single** discount.

The wording of the question is a little loose. Here K% is taken as this equivalent single discount (29.44%), so the new SP $=3750-1104=2646$ rupees. In the exam, **Rs. 2,646** was accepted.

Examiner's Trap If you take K% as 16% and apply it just once, SP $=3750\times0.84=3150$ rupees, which is option B. This mix-up is what makes the question feel confusing.

13 ANSWER (b) Rs8,000

SSC Phase-XIV (12th) 25 Sep 2026, Shift-II

Concept: Multiplier Method Turn every change into a multiplier. +25% means 1.25, a 20% discount means 0.8 and a 5% discount means 0.95

Let the original marked price $=M$.
Final SP $=M\times1.25\times0.8\times0.95=0.95M$

$0.95M=7600\Rightarrow M=\frac{7600}{0.95}=8000$
The original marked price was **Rs8,000**.

Short Trick Note that $1.25\times0.8=1$. The 25% increase and the 20% discount cancel each other out. Only the 5% discount is left, so $\frac{7600}{0.95}=8000$.

14 ANSWER (b) Rs. 680

SSC Phase-XIV (Matric) 16 Sep 2026, Shift-III

Formula: SP SP $=MP\times\frac{100-d}{100}$

A 15% discount means you pay 85% of the MP.
SP $=800\times\frac{85}{100}=680$ rupees, that is, **Rs. 680**.

15 **ANSWER (c)** Rs. 2400

SSC Phase-XIV (Matric) 16 Sep 2026, Shift-III

Concept: Successive Discount SP
$= MP \times 0.9 \times 0.8 = 0.72\,MP$

$0.72 \times MP = 1728$

$MP = \frac{1728}{0.72} = 2400$ rupees. So the marked price was **Rs. 2400**.

Examiner's Trap Many students add 10% + 20% = 30% and calculate $\frac{1728}{0.7} \approx 2468.6$. Remember, successive discounts are multiplied, not added.

16 **ANSWER (b)** 15%

SSC Phase-XIV (Matric) 17 Sep 2026, Shift-III

Formula: Discount % Discount % = (Discount ÷ Marked Price) × 100

Direct method: Discount % $= \frac{60}{400} \times 100 = 15\%$
The answer is **15%**.

17 **ANSWER (b)** Rs. 1800

SSC Phase-XIV (Matric) 17 Sep 2026, Shift-III

Formula: Equivalent Discount Two successive discounts of $a\%$ and $b\%$ $= \left(a + b - \frac{ab}{100}\right)\%$

First, find the total discount: $10 + 20 - \frac{200}{100} = 28\%$

A 28% discount means paying 72% of the MP.
SP $= 2500 \times 0.72 = 1800$ rupees, so the answer is **Rs. 1800**.

18 **ANSWER (c)** Rs180

SSC Phase-XIV (Matric) 18 Sep 2026, Shift-III

We need 12% of 1500.
Discount $= 1500 \times \frac{12}{100} = 15 \times 12 = 180$ rupees. That is **Rs180**.

19 **ANSWER (b)** Rs30

SSC Phase-XIV (Matric) 18 Sep 2026, Shift-III

Formula: Equivalent Discount $a\%$, $b\%$ successive $= \left(a + b - \frac{ab}{100}\right)\%$

Let us find each SP separately.
First seller: SP $= 1500 \times 0.70 = 1050$ rupees.
Second seller: SP $= 1500 \times 0.80 \times 0.90 = 1080$ rupees.
Difference $= 1080 - 1050 = 30$ rupees, that is, **Rs30**.

Short Trick 20% and 10% successive $= 20 + 10 - 2 = 28\%$. Now 30% and 28% differ by just 2%, and 2% of 1500 = 30 rupees. Done in one line.

20 **ANSWER (c)** 40%

SSC Phase-XIV (Matric) 19 Sep 2026, Shift-III

Concept: Buy x Get y Discount % $= \frac{y}{x+y} \times 100$

The customer gets $3 + 2 = 5$ items in hand but pays for only 3. So 2 out of 5 are free.

Effective discount $= \frac{2}{5} \times 100 = 40\%$
So the correct option is **40%**.

Examiner's Trap In the exam, students often take $\frac{2}{3} \times 100$. The discount is always calculated on the marked price of all the items received (5 here), not on the 3 that were bought.

21 **ANSWER (c)** Rs. 1200

SSC Phase-XIV (Matric) 19 Sep 2026, Shift-III

If it is reduced by 20%, then 80% is left.
$1500 \times \frac{80}{100} = 1200$ rupees, that is, **Rs. 1200**.

22 **ANSWER (b)** 20%

SSC Phase-XIV (Matric) 21 Sep 2026, Shift-III

Formula: Discount % Discount % $= \frac{MP - SP}{MP} \times 100$

First, find the discount: $1250 - 1000 = 250$ rupees.
Discount % $= \frac{250}{1250} \times 100 = 20\%$
So **20%** is correct.

Examiner's Trap If you do $\frac{250}{1000} \times 100 = 25\%$, you land on option D. Note that discount is always calculated on the MP, not on the SP.

23 **ANSWER (c)** Rs. 880

SSC Phase-XIV (Matric) 21 Sep 2026, Shift-III

The CP is 800 and the MP is set 25% above it.
Marked price $= 800 \times 1.25 = 1000$ rupees.

After a 12% discount, SP $= 1000 \times 0.88 = 880$ rupees.
The answer is **Rs. 880**.

24 **ANSWER (b)** Rs. 720

SSC Phase-XIV (Matric) 22 Sep 2026, Shift-III

25% means $\frac{1}{4}$, so the discount $= \frac{960}{4} = 240$ rupees.

SP $= 960 - 240 = 720$ rupees. The correct option is **Rs. 720**.

25 **ANSWER (c)** Rs. 480

SSC Phase-XIV (Matric) 22 Sep 2026, Shift-III

Formula: Equivalent Discount $a\%$, $b\%$ successive $= \left(a + b - \frac{ab}{100}\right)\%$

Total discount % $= 20 + 5 - \frac{100}{100} = 24\%$

Now take 24% of 2000.

Total discount $= 2000 \times \frac{24}{100} = 480$ rupees, that is, **Rs. 480**.

Examiner's Trap If you simply add $20\% + 5\% = 25\%$, you get 500 rupees (option D). The second discount applies to the reduced price, not to the full MP.

26 **ANSWER (c)** Rs16,000

SSC Phase-XIV (Matric) 23 Sep 2026, Shift-III

Formula: MP MP $= \frac{SP \times 100}{100 - d}$

After a 25% discount, 75% is left, and that equals 12000.

MP $= \frac{12000 \times 100}{75} = 16000$ rupees. So the marked price comes to **Rs16,000**.

27 **ANSWER (a)** 10%

SSC Phase-XIV (Matric) 23 Sep 2026, Shift-III

First, apply the 15% discount: $12000 \times 0.85 = 10200$ rupees.

Now the second discount $= 10200 - 9180 = 1020$ rupees.

Second discount % $= \frac{1020}{10200} \times 100 = 10\%$, that is, **10%**.

Examiner's Trap The second discount percentage is calculated on the reduced price (10200). If you calculate it on the original MP (12000), you will get a wrong answer.

28 **ANSWER (c)** Rs. 1700

SSC Phase-XIV (Matric) 24 Sep 2026, Shift-III

After a 10% discount, the SP is 90% of the MP.

$MP = \frac{1530}{0.9} = 1700$ rupees. The answer is **Rs. 1700**.

29 **ANSWER (b)** Rs. 25,650

SSC Phase-XIV (Matric) 24 Sep 2026, Shift-III

Formula: Equivalent Discount $a\%$, $b\%$ successive $= \left(a + b - \frac{ab}{100}\right)\%$

Total discount of 5% and 10% $= 5 + 10 - 0.5 = 14.5\%$

So the customer pays 85.5% of the MP.

SP $= 30000 \times 0.855 = 25650$ rupees, that is, **Rs. 25,650**.

30 **ANSWER (c)** Rs. 2280

SSC Phase-XIV (Matric) 25 Sep 2026, Shift-III

Discount $= 2400 \times \frac{5}{100} = 120$ rupees.

SP $= 2400 - 120 = 2280$ rupees. That makes **Rs. 2280** correct.

31 **ANSWER (c)** Rs. 2400

SSC Phase-XIV (Matric) 25 Sep 2026, Shift-III

Let the marked price $= M$. After a 15% discount, 85% comes in hand, that is, $0.85M = 2040$

$M = \frac{2040}{0.85} = 2400$ rupees. So the MP must be set at **Rs. 2400**.

Short Trick You can do it quickly from the options too: $2400 \times 0.85 = 2040$, a direct match.

09
CHAPTER

Simple Interest

Questions *16 questions · 16 shifts*

Simple Interest

Directions (Q. 01–16): *Choose the correct answer from the four given options.*

01 A person invested a certain sum at 10% per annum simple interest. After 4 years, the interest earned was Rs3,600 less than the sum invested. What was the sum invested?

SSC Phase-XIV (Graduation) 17 Sep 2026, Shift-I

(a) Rs7000 (b) Rs6000 (c) Rs6500 (d) Rs9000

02 A sum of Rs5,000 amounts to Rs6,500 in 3 years at simple interest. If the rate of interest is doubled, what will the same sum amount to in 5 years?

SSC Phase-XIV (Graduation) 19 Sep 2026, Shift-I

(a) Rs9,000 (b) Rs10,000
(c) Rs8,500 (d) Rs11,000

03 After 5 years, the ratio of principal to amount is 4 : 7. At the same rate, in how many years will the ratio of principal to simple interest become 5 : 6?

SSC Phase-XIV (Graduation) 22 Sep 2026, Shift-I

(a) 8 years (b) 10 years
(c) 12 years (d) 15 years

04 A sum of Rs15,600 is invested in a simple interest scheme. The person receives Rs4,680 as interest after 3 years. If he had invested the same sum for 5 years at a rate 2% less than the original rate, what would the interest have been?

SSC Phase-XIV (Graduation) 24 Sep 2026, Shift-I

(a) Rs6,240 (b) Rs5,400 (c) Rs6,500 (d) Rs5,850

05 Raj deposited Rs. 800 in a savings account that earns simple interest. After 3 years, the total amount became Rs. 956. If the rate of interest is increased by 4%, what will be the total amount after 3 years at the new rate?

SSC Phase-XIV (12th) 17 Sep 2026, Shift-II

(a) 1547 (b) 1343 (c) 1052 (d) 1232

06 A total sum is divided between A and B such that A gets Rs6,000 more than B. A's share is lent at 8% per annum and B's share at 11% per annum simple interest for 3 years. If the total interest earned is Rs8,280, find the total sum invested.

SSC Phase-XIV (12th) 22 Sep 2026, Shift-II

(a) Rs28,000 (b) Rs30,000
(c) Rs32,000 (d) Rs36,000

07 A sum lent at simple interest amounts to Rs18,720 in 4 years and Rs21,120 in 6 years. If the same sum is lent at 12% per annum simple interest, what will the amount be after 5 years?

SSC Phase-XIV (12th) 25 Sep 2026, Shift-II

(a) Rs21,600 (b) Rs22,272
(c) Rs22,800 (d) Rs23,040

08 A sum of Rs. 5000 is invested at simple interest. The interest for 4 years is equal to 60% of the principal. What is the annual rate of interest?

SSC Phase-XIV (Matric) 16 Sep 2026, Shift-III

(a) 12% (b) 15% (c) 18% (d) 20%

09 A sum of Rs460 amounts to Rs640 in 6 years at simple interest. At the same annual rate of interest, what will be the total amount in just 2 years?

SSC Phase-XIV (Matric) 17 Sep 2026, Shift-III

(a) Rs480 (b) Rs500 (c) Rs520 (d) Rs540

10 A principal amounts to Rs7500 in 5 years and Rs8700 in 9 years at simple interest. Find the rate of interest per annum.

SSC Phase-XIV (Matric) 18 Sep 2026, Shift-III

(a) 4% (b) 5% (c) 6% (d) 7.50%

11 Find the principal if the difference between the simple interest at 3% per annum and at 2.5% per annum for 4 years is Rs60.

SSC Phase-XIV (Matric) 19 Sep 2026, Shift-III

(a) Rs2500 (b) Rs3000 (c) Rs4000 (d) Rs3500

12 The simple interest on a certain sum at 7% per annum for 6 years is Rs. 1260. What will be the interest on the same sum at 9% per annum for 4 years?

SSC Phase-XIV (Matric) 21 Sep 2026, Shift-III

(a) Rs. 1080 (b) Rs. 1140
(c) Rs. 1200 (d) Rs. 1260

13 A person borrows Rs4000 at 6% per annum simple interest. After 3 years, he repays Rs2500. How much is still due immediately after the repayment?

SSC Phase-XIV (Matric) 22 Sep 2026, Shift-III

(a) Rs. 1980 (b) Rs. 2080
(c) Rs. 2140 (d) Rs. 2220

14 A moneylender lends Rs60 and receives Rs66 after a period of four months. What is the annual rate of simple interest charged on this loan?

SSC Phase-XIV (Matric) 23 Sep 2026, Shift-III

(a) 20% (b) 25% (c) 30% (d) 35%

15 At what rate per cent per annum simple interest will Rs. 2400 amount to Rs. 3120 in 5 years?

SSC Phase-XIV (Matric) 24 Sep 2026, Shift-III

(a) 5% (b) 6% (c) 7% (d) 8%

16 A person takes two different loans at the same rate of simple interest: Rs29,000 for a period of 3 years and Rs45,000 for 5 years. If the total interest paid on both loans is Rs62,400, find the annual rate of interest.

SSC Phase-XIV (Matric) 25 Sep 2026, Shift-III

(a) 20% (b) 15% (c) 30% (d) 10%

Answer Key *SSC official key*

Simple Interest (Q. 01–16)

01	(b)	**02**	(b)	**03**	(a)	**04**	(a)	**05**	(c)	**06**	(b)	**07**	(b)	**08**	(b)	**09**	(c)	**10**	(b)
11	(b)	**12**	(a)	**13**	(d)	**14**	(c)	**15**	(b)	**16**	(a)								

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Simple Interest

01 **ANSWER (b)** Rs6000

SSC Phase-XIV (Graduation) 17 Sep 2026, Shift-I

Formula: SI $SI = \frac{P \times R \times T}{100}$

Interest for 4 years at 10% $= \frac{P \times 10 \times 4}{100} = 0.4P$

The question says the interest is 3600 less than the principal.

$P - 0.4P = 0.6P = 3600$

$P = \frac{3600}{0.6} = 6000$ rupees, that is, **Rs6000**.

02 **ANSWER (b)** Rs10,000

SSC Phase-XIV (Graduation) 19 Sep 2026, Shift-I

Formula: SI $R = \frac{SI \times 100}{P \times T}$

Interest for 3 years $= 6500 - 5000 = 1500$ rupees.
$R = \frac{1500 \times 100}{5000 \times 3} = 10\%$
When the rate is doubled, it becomes 20%. Total interest in 5 years $= 20 \times 5 = 100\%$, which means the whole principal, that is, 5000 rupees.

Amount $= 5000 + 5000 = 10000$ rupees. The answer comes to **Rs10,000**.

03 **ANSWER (a)** 8 years

SSC Phase-XIV (Graduation) 22 Sep 2026, Shift-I

Concept: SI as % of P Total SI% $= R \times T$ (as a percentage of the principal)

Let $P = 4$ units, so the amount $= 7$ units and the interest for 5 years $= 3$ units.
SI% for 5 years $= \frac{3}{4} \times 100 = 75\%$, so $R = \frac{75}{5} = 15\%$

Now we need $P : SI = 5 : 6$, that is, SI $= \frac{6}{5} \times 100 = 120\%$ of the principal.
$T = \frac{120}{15} = 8$, so it will take **8 years**.

Examiner's Trap The first ratio is principal : **amount**, not interest. So do not forget to find the interest as $7 - 4 = 3$ units.

04 **ANSWER (a)** Rs6,240

SSC Phase-XIV (Graduation) 24 Sep 2026, Shift-I

Formula: SI $SI = \frac{P \times R \times T}{100}$

First, find the old rate.
$R = \frac{4680 \times 100}{15600 \times 3} = \frac{468000}{46800} = 10\%$
Reducing it by 2%, the new rate $= 10 - 2 = 8\%$
$SI = \frac{15600 \times 8 \times 5}{100} = 156 \times 40 = 6240$ rupees. That is **Rs6,240**.

05 **ANSWER (c)** 1052

SSC Phase-XIV (12th) 17 Sep 2026, Shift-II

Concept: Increase in Rate If the rate increases by x%, extra interest $= \frac{P \times x \times T}{100}$

Old interest $= 956 - 800 = 156$ rupees (for 3 years).

Extra interest due to the 4% increase in rate $= \frac{800 \times 4 \times 3}{100} = 96$ rupees.

New total amount $= 956 + 96 = 1052$ rupees. The correct option is **1052**.

Short Trick There is no need to find the old rate (6.5%) at all. Just add the extra interest directly to the old amount.

06 **ANSWER (b)** Rs30,000

SSC Phase-XIV (12th) 22 Sep 2026, Shift-II

Let B's share $= x$, so A's share $= x + 6000$.
In 3 years, the interest on A will be 24% and on B 33%.

$0.24(x + 6000) + 0.33x = 8280$
$0.57x + 1440 = 8280 \Rightarrow 0.57x = 6840 \Rightarrow x = 12000$

So B $= 12000$ and A $= 18000$.
Total sum $= 30000$ rupees, that is, **Rs30,000**.

07 **ANSWER (b)** Rs22,272

SSC Phase-XIV (12th) 25 Sep 2026, Shift-II

Concept: Amount Difference Difference of two amounts = interest for the years in between

Interest for the 2 years between year 4 and year 6 $= 21120 - 18720 = 2400$, so interest for 1 year $= 1200$ rupees.

Now remove the interest for 4 years: principal $= 18720 - 4 \times 1200 = 13920$ rupees.

At 12%, the interest for 5 years will be 60%.
Amount $= 13920 \times 1.6 = 22272$ rupees. The answer is **Rs22,272**.

08 **ANSWER (b)** 15%

SSC Phase-XIV (Matric) 16 Sep 2026, Shift-III

Concept: SI% Total SI% $= R \times T$

$R \times 4 = 60 \Rightarrow R = 15\%$
The principal of 5000 here is just a distraction. We never needed it. The rate is **15%**.

09 **ANSWER (c)** Rs520

SSC Phase-XIV (Matric) 17 Sep 2026, Shift-III

Interest for 6 years $= 640 - 460 = 180$, that is, 30 rupees every year.

Interest in 2 years $= 60$, so the amount $= 460 + 60 = 520$ rupees. Straight to **Rs520**.

10 **ANSWER (b)** 5%

SSC Phase-XIV (Matric) 18 Sep 2026, Shift-III

Concept: Amount Difference Difference of two amounts = interest for the years in between

Interest for the 4 years between year 5 and year 9 $= 8700 - 7500 = 1200$, so interest for 1 year $= 300$ rupees.

Principal $= 7500 - 5 \times 300 = 6000$ rupees.

Rate $= \frac{300}{6000} \times 100 = 5\%$, so the answer comes to **5%**.

11 **ANSWER (b)** Rs3000

SSC Phase-XIV (Matric) 19 Sep 2026, Shift-III

Concept: Rate Difference Difference in interest $= \frac{P \times (R_1 - R_2) \times T}{100}$

The difference in rates is $3 - 2.5 = 0.5\%$.

$\frac{P \times 0.5 \times 4}{100} = 60 \Rightarrow \frac{2P}{100} = 60$

$P = 3000$ rupees, that is, **Rs3000**.

12 **ANSWER (a)** Rs. 1080

SSC Phase-XIV (Matric) 21 Sep 2026, Shift-III

Concept: SI ∝ R × T For the same principal, $SI \propto R \times T$

In the first case $R \times T = 7 \times 6 = 42$, in the second case $9 \times 4 = 36$

New interest $= 1260 \times \frac{36}{42} = 30 \times 36 = 1080$ rupees. So **Rs. 1080**.

Short Trick There is no need to find the principal (3000). Multiply directly by $\frac{36}{42}$ and you have the answer in two lines.

13 **ANSWER (d)** Rs. 2220

SSC Phase-XIV (Matric) 22 Sep 2026, Shift-III

Interest for 3 years $= \frac{4000 \times 6 \times 3}{100} = 720$ rupees. So the total dues $= 4720$ rupees.

After paying 2500, the balance is $4720 - 2500 = 2220$ rupees. That makes option **Rs. 2220** correct.

14 **ANSWER (c)** 30%

SSC Phase-XIV (Matric) 23 Sep 2026, Shift-III

Formula: SI $R = \frac{SI \times 100}{P \times T}$, where T is in years

Interest $= 66 - 60 = 6$ rupees. The time is 4 months, that is, $\frac{1}{3}$ year.

$R = \frac{6 \times 100}{60 \times \frac{1}{3}} = \frac{600}{20} = 30\%$

The annual rate works out to **30%**.

Examiner's Trap If you mistakenly take 4 months as 4 years, the rate comes to 2.5%. Always convert time into years.

15 **ANSWER (b)** 6%

SSC Phase-XIV (Matric) 24 Sep 2026, Shift-III

Formula: SI $R = \frac{SI \times 100}{P \times T}$

First find the interest. Interest for 5 years = 3120 − 2400 = ₹720

Now put the values in the formula:

$R = \frac{720 \times 100}{2400 \times 5} = \frac{72000}{12000} = 6$

So the rate is **6%**.

Short Trick Interest for one year = 720 ÷ 5 = 144. Now look, 1% of 2400 = 24, and 144 = 6 × 24. That is straight away 6%.

16 **ANSWER (a)** 20%

SSC Phase-XIV (Matric) 25 Sep 2026, Shift-III

Formula: SI $SI = \frac{P \times R \times T}{100}$

Let the rate be R%. Interest on the first loan = $\frac{29000 \times R \times 3}{100} = 870R$

In the same way, interest on the second loan = $\frac{45000 \times R \times 5}{100} = 2250R$

Add the two: $870R + 2250R = 3120R = 62400$, which gives $R = 20$

The correct option is **20%**.

Short Trick Total "principal × years" = 29000×3 + 45000×5 = 312000. 1% of this is 3120. Now 62400 ÷ 3120 = 20, and that is the rate.

10 CHAPTER Compound Interest

Questions *18 questions · 18 shifts*

Compound Interest

Directions (Q. 01–18): *Choose the correct answer from the four given options.*

01 If Rs6,400 is invested at 5% compound interest for 3 years, find the amount.

SSC Phase-XIV (Graduation) 17 Sep 2026, Shift-I

(a) Rs7208.80 (b) Rs7408.80
(c) Rs7308.80 (d) Rs7008.80

02 A parent invested Rs3,00,000 in a UK education bond at 8% per annum compound interest for 3 years. Later, due to devaluation, the amount received was converted and reinvested in India for 2 more years at 10% per annum compound interest. If the amount becomes Rs3,78,000 after the UK bond matures, what will be the amount after 5 years?

SSC Phase-XIV (Graduation) 18 Sep 2026, Shift-I

(a) Rs4,55,000 (b) Rs4,57,380
(c) Rs4,60,000 (d) Rs4,50,000

03 A loan of Rs12,400 is taken at 10% compound interest, to be repaid in two equal annual instalments. Find the approximate instalment amount.

SSC Phase-XIV (Graduation) 19 Sep 2026, Shift-I

(a) Rs7,643 (b) Rs7,043 (c) Rs7,743 (d) Rs7,145

04 A sum of Rs20,000 is borrowed at 10% compound interest, to be repaid in two equal annual instalments. Find the approximate value of each instalment.

SSC Phase-XIV (Graduation) 21 Sep 2026, Shift-I

(a) Rs11,922 (b) Rs12,522
(c) Rs11,524 (d) Rs11,022

05 If a sum of Rs1,000 becomes Rs1,210 in 2 years when compounded annually, find the rate of interest.

SSC Phase-XIV (Graduation) 22 Sep 2026, Shift-I

(a) 7% (b) 15% (c) 13% (d) 10%

06 Find the compound interest on Rs2,500 at 20% per annum for 1 year 9 months, when compounded annually.

SSC Phase-XIV (Graduation) 23 Sep 2026, Shift-I

(a) Rs1050 (b) Rs950 (c) Rs1000 (d) Rs900

07 If a sum of Rs2,000 becomes Rs2,315.25 in 3 years at compound interest, what is the rate per cent per annum?

SSC Phase-XIV (Graduation) 24 Sep 2026, Shift-I

(a) 7% (b) 5% (c) 9% (d) 10%

08 What will be the compound interest, compounded annually, on Rs8,000 at 5% per annum for 2 years 3 months?

SSC Phase-XIV (Graduation) 25 Sep 2026, Shift-I

(a) Rs1000.25 (b) Rs930.25
(c) Rs990.25 (d) Rs900.25

09 What should be the annual rate to get a compound interest of Rs. 39,312 on Rs. 54,000 in 9 months, compounded quarterly?

SSC Phase-XIV (12th) 16 Sep 2026, Shift-II

(a) 45% (b) 54% (c) 72% (d) 80%

10 A businessman lent Rs. 512 to two persons, one loan at simple interest and the other at compound interest, both at the same annual rate of interest. After 3 years, the difference between the compound interest and the simple interest is Rs. 25. After 2 years, this difference is Rs. 8. Determine the annual rate of interest.

SSC Phase-XIV (12th) 17 Sep 2026, Shift-II

(a) 18.65% (b) 12.5% (c) 13.42% (d) 17.26%

11 The difference between the compound interest and the simple interest on a certain sum at 5% per annum for 3 years is Rs244. Find the principal.

SSC Phase-XIV (12th) 18 Sep 2026, Shift-II

(a) Rs24,000 (b) Rs35,000
(c) Rs32,000 (d) Rs28,000

12 A certain sum is invested at 16.67% per annum, with interest compounded annually. After being invested for 3 years, the accumulated amount becomes Rs15,000. Find the amount at the end of the fourth year.

SSC Phase-XIV (12th) 19 Sep 2026, Shift-II

(a) Rs18,500 (b) Rs17,500
(c) Rs17,000 (d) Rs17,250

13 A principal of Rs24,000 is invested at 10% per annum, with interest compounded annually. What is the difference between the compound interest earned in the third year and in the fourth year?

SSC Phase-XIV (12th) 21 Sep 2026, Shift-II

(a) Rs290.4 (b) Rs300.5 (c) Rs275.4 (d) Rs280.5

14 A sum of money at compound interest, compounded annually, becomes Rs16,900 in 2 years and Rs21,970 in 3 years. What is the annual rate of interest?

SSC Phase-XIV (12th) 22 Sep 2026, Shift-II

(a) 20% (b) 25% (c) 35% (d) 30%

15 What is the difference between the compound interest on Rs14,500 at 9% per annum for 1 year when the interest is compounded annually and when it is compounded half-yearly?

SSC Phase-XIV (12th) 23 Sep 2026, Shift-II

(a) Rs. 30.21 (b) Rs. 30.56
(c) Rs. 30.98 (d) Rs. 29.36

16 Michael takes a loan from a finance company at a compound interest rate of 8.33% per annum. He agrees to repay the loan in two instalments: Rs6,500 at the end of the first year and Rs8,450 at the end of the second year. Assuming that the interest is compounded annually, how much total interest did Michael pay over the two years?

SSC Phase-XIV (12th) 24 Sep 2026, Shift-II

(a) Rs1,960 (b) Rs1,850 (c) Rs1,750 (d) Rs1,820

17 A sum invested at 20% per annum compound interest, compounded half-yearly, amounts to Rs26,620 in 1.5 years. Find the principal.

SSC Phase-XIV (12th) 25 Sep 2026, Shift-II

(a) Rs18,000 (b) Rs20,000
(c) Rs21,000 (d) Rs22,000

18 A sum of money amounts to Rs47,600 at compound interest. If the rates of interest for the three years are 11.11%, 16.66% and 12.5% respectively, find the compound interest.

SSC Phase-XIV (12th) 26 Sep 2026, Shift-I

(a) Rs13,360 (b) Rs15,000
(c) Rs14,960 (d) Rs17,560

Answer Key *SSC official key*

Compound Interest (Q. 01–18)

01	(b)	**02**	(b)	**03**	(d)	**04**	(c)	**05**	(d)	**06**	(b)	**07**	(b)	**08**	(b)	**09**	(d)	**10**	(b)
11	(c)	**12**	(b)	**13**	(a)	**14**	(d)	**15**	(d)	**16**	(c)	**17**	(b)	**18**	(c)				

Detailed Explanations रटना बंद, समझना शुरू

Compound Interest

01 **ANSWER (b)** Rs7408.80

SSC Phase-XIV (Graduation) 17 Sep 2026, Shift-I

Formula: CI Amount $A = P\left(1 + \frac{R}{100}\right)^n$

Write 5% as a fraction: $\frac{1}{20}$. This means the sum becomes $\frac{21}{20}$ times every year.

$A = 6400 \times \frac{21}{20} \times \frac{21}{20} \times \frac{21}{20} = 6400 \times \frac{9261}{8000} = 0.8 \times 9261 = 7408.80$

The amount comes to **Rs7408.80**.

02 **ANSWER (b)** Rs4,57,380

SSC Phase-XIV (Graduation) 18 Sep 2026, Shift-I

Formula: CI Amount $A = P\left(1 + \frac{R}{100}\right)^n$

Note that the amount after 3 years is already given in the question: ₹3,78,000. This is the principal for the next 2 years.

$A = 378000 \times (1.1)^2 = 378000 \times 1.21 = 457380$

So the final amount is **Rs4,57,380**.

Examiner's Trap Do not redo the 8% calculation. The amount received on maturity of the bond (₹3,78,000) is given directly. Just apply 10% for 2 years on it.

03 **ANSWER (d)** Rs7,145

SSC Phase-XIV (Graduation) 19 Sep 2026, Shift-I

Concept: Equal Instalments Loan = sum of the present values of all instalments: $P = \frac{x}{1.1} + \frac{x}{1.1^2}$

$12400 = \frac{x}{1.1} + \frac{x}{1.21}$

Multiply both sides by 1.21 and you get

$12400 \times 1.21 = 1.1x + x = 2.1x$

$x = \frac{15004}{2.1} \approx 7144.76 \approx 7145$

So each instalment is about **Rs7,145**.

Short Trick At 10%, the principal parts of the two instalments are 10x/11 and 100x/121. Add them and the loan = $\frac{210}{121}x$, so $x = 12400 \times \frac{121}{210}$.

04 **ANSWER (c)** Rs11,524

SSC Phase-XIV (Graduation) 21 Sep 2026, Shift-I

Concept: Equal Instalments $P = \frac{x}{1.1} + \frac{x}{1.1^2}$

$20000 = \frac{x}{1.1} + \frac{x}{1.21}$. Multiplying both sides by 1.21 gives $20000 \times 1.21 = 2.1x$, that is, $24200 = 2.1x$

$x = \frac{24200}{2.1} \approx 11523.8 \approx 11524$

So one instalment is about **Rs11,524**.

Examiner's Trap Do not take the instalment as half of the amount. The 2-year amount is 24200 and half of it is 12100, but that is wrong. Remember, the first instalment is paid a year earlier.

05 **ANSWER (d)** 10%

SSC Phase-XIV (Graduation) 22 Sep 2026, Shift-I

Formula: CI Amount $A = P(1 + r)^n$

$1000(1 + r)^2 = 1210$, so $(1 + r)^2 = 1.21$

Take the square root: $1 + r = \sqrt{1.21} = 1.1$, which means $r = 0.1$, that is, **10%**.

06 **ANSWER (b)** Rs950

SSC Phase-XIV (Graduation) 23 Sep 2026, Shift-I

Concept: CI for Part Years With annual compounding, apply CI for the full years, then SI on that amount for the remaining months.

First year: 2500 × 1.2 = ₹3000

Rate for the remaining 9 months = $20 \times \frac{9}{12} = 15\%$. So interest = 15% of 3000 = ₹450

Amount = 3000 + 450 = ₹3450, and CI = 3450 − 2500 = **Rs950**

07 **ANSWER (b)** 5%

SSC Phase-XIV (Graduation) 24 Sep 2026, Shift-I

Formula: CI Amount $A = P(1 + r)^n$

$(1 + r)^3 = \frac{2315.25}{2000} = 1.157625$

Now recognise this value: $1.05^3 = 1.157625$. So $1 + r = 1.05$, and the rate is **5%**.

Short Trick Remember these two cubes: $1.05^3 = 1.157625$ and $1.1^3 = 1.331$. The growth in 3 years is 15.76%, just a little above 15%, so the rate

is clearly 5%.

08 **ANSWER (b)** Rs930.25

SSC Phase-XIV (Graduation) 25 Sep 2026, Shift-I

Concept: CI for Part Years CI for the full years, then SI on that amount for the remaining months

After 2 years: $8000 \times 1.05^2 = 8000 \times 1.1025 = 8820$

Rate for the remaining 3 months = $5 \times \frac{3}{12} = 1.25\%$.
Interest = 8820 × 0.0125 = ₹110.25

Amount = 8930.25, so CI = 8930.25 − 8000 = **Rs930.25**

09 **ANSWER (d)** 80%

SSC Phase-XIV (12th) 16 Sep 2026, Shift-II

Concept: Quarterly CI Rate = $\frac{R}{4}\%$, periods = 4 × years

Amount = 54000 + 39312 = ₹93312. And 9 months means 3 quarters.

$\left(1+\frac{R}{400}\right)^3 = \frac{93312}{54000} = 1.728 = 1.2^3$

So $\frac{R}{400} = 0.2$, which gives R = 80. The annual rate is **80%**.

Short Trick To simplify $\frac{93312}{54000}$, look at the factors: $93312 = 2^7 \times 3^6$ and $54000 = 2^4 \times 3^3 \times 5^3$. The ratio left is $\frac{216}{125} = \left(\frac{6}{5}\right)^3$.

10 **ANSWER (b)** 12.5%

SSC Phase-XIV (12th) 17 Sep 2026, Shift-II

Formula: CI − SI 2 years: Pr^2, 3 years: $Pr^2(3+r)$

Take the 2-year difference: $512r^2 = 8$, so $r^2 = \frac{1}{64}$ and $r = \frac{1}{8}$

Let us check with 3 years:
$512 \times \frac{1}{64} \times \left(3+\frac{1}{8}\right) = 8 \times 3.125 = 25$ ✓

$r = \frac{1}{8}$, that is, **12.5%**.

11 **ANSWER (c)** Rs32,000

SSC Phase-XIV (12th) 18 Sep 2026, Shift-II

Formula: 3-Year CI − SI $D = \frac{PR^2(300+R)}{100^3}$

Put in the values: $244 = \frac{P \times 25 \times 305}{1000000} = \frac{7625P}{1000000}$

$P = \frac{244 \times 1000000}{7625} = 32000$

The principal comes out to **Rs32,000**.

Short Trick At 5% for 3 years, the difference is always 0.7625% of the principal. Check from the options: 32000 × 0.007625 = 244, done.

12 **ANSWER (b)** Rs17,500

SSC Phase-XIV (12th) 19 Sep 2026, Shift-II

Concept: CI Multiplier 16.67% = $\frac{1}{6}$, so every year the amount × $\frac{7}{6}$

The amount after 3 years is ₹15,000. In the fourth year, just one more year's interest gets added to it.

$15000 \times \frac{7}{6} = 17500$, so at the end of the fourth year it is **Rs17,500**.

Examiner's Trap Do not waste time finding the principal. In CI, next year's amount = previous year's amount × multiplier.

13 **ANSWER (a)** Rs290.4

SSC Phase-XIV (12th) 21 Sep 2026, Shift-II

Concept: CI of the nth Year Interest of the nth year = amount after (n−1) years × rate

Interest of the third year =
$24000 \times 1.1^2 \times 0.1 = 29040 \times 0.1 = 2904$

Interest of the fourth year = $2904 \times 1.1 = 3194.4$

Difference = 3194.4 − 2904 = **Rs290.4**

Short Trick The difference between the CI of two consecutive years = R% of the earlier year's CI. Here 10% of 2904 = 290.4, and the job is done in one line.

14 **ANSWER (d)** 30%

SSC Phase-XIV (12th) 22 Sep 2026, Shift-II

Concept: Consecutive Amounts Next year's amount − previous year's amount = R% of the previous year's amount

Interest added in the third year = 21970 − 16900 = ₹5070. This is one year's interest on 16900.

$R = \frac{5070}{16900} \times 100 = 30$, so the rate is **30%**.

15 **ANSWER (d)** Rs. 29.36

SSC Phase-XIV (12th) 23 Sep 2026, Shift-II

Concept: Half-yearly CI Rate = $\frac{R}{2}$%, periods = 2 × years

With annual compounding, interest for 1 year = 9% of 14500 = ₹1305

Half-yearly gives 2 periods of 4.5%. Effective rate = 4.5 + 4.5 + (4.5×4.5)/100 = 9.2025%

So the gap is only the extra 0.2025%: 14500 × 0.002025 = **Rs. 29.36**

Short Trick Direct formula: difference = $P\times\left(\frac{R}{200}\right)^2 = 14500\times 0.045^2 = 29.3625$

16 ANSWER (c) Rs1,750

SSC Phase-XIV (12th) 24 Sep 2026, Shift-II

Concept: PV of Instalments 8.33% = $\frac{1}{12}$, so the multiplier is $\frac{13}{12}$

Principal part of the first instalment = $6500\times\frac{12}{13} = 6000$

Principal part of the second instalment = $8450\times\frac{144}{169} = 7200$. Total loan = ₹13200

Michael paid 6500 + 8450 = ₹14950 in all. Out of this, interest = 14950 − 13200 = **Rs1,750**

17 ANSWER (b) Rs20,000

SSC Phase-XIV (12th) 25 Sep 2026, Shift-II

Concept: Half-yearly CI Rate = $\frac{R}{2}$%, periods = 2 × years

Half-yearly rate = 10%, and periods = 1.5 × 2 = 3

$P\times 1.1^3 = 26620$, that is, $1.331P = 26620$, so $P = 20000$

The principal was **Rs20,000**.

Short Trick Multiplier $\left(\frac{11}{10}\right)^3 = \frac{1331}{1000}$. Now 26620 ÷ 1331 = 20, so P = 20 × 1000.

18 ANSWER (c) Rs14,960

SSC Phase-XIV (12th) 26 Sep 2026, Shift-I

Concept: Varying Rates $A = P(1 + r_1)(1 + r_2)(1 + r_3)$

Change to fractions: 11.11% = $\frac{1}{9}$, 16.66% = $\frac{1}{6}$, 12.5% = $\frac{1}{8}$. Multiplier = $\frac{10}{9}\times\frac{7}{6}\times\frac{9}{8} = \frac{35}{24}$

Principal = $47600\times\frac{24}{35} = 32640$

CI = 47600 − 32640 = **Rs14,960**

Short Trick Principal : Amount = 24 : 35, so CI = 11 parts. 1 part = 47600 ÷ 35 = 1360, and CI = 11 × 1360 = 14960.

11
CHAPTER

Partnership

Questions *15 questions · 15 shifts*

Partnership

Directions (Q. 01–15): *Choose the correct answer from the four given options.*

01 X and Y started a business with investments in the ratio 5 : 4. After 8 months, X withdrew his entire amount. If the profit at the end of the year was divided in the ratio 5 : 9, for how many months did Y invest his money?

SSC Phase-XIV (Graduation) 17 Sep 2026, Shift-I

(a) 12 months (b) 14 months
(c) 18 months (d) 16 months

02 A, B and C enter into a partnership in which A's capital is used for 5 months and he claims $\frac{1}{7}$ of the profit. B's capital is used for 7 months and he claims $\frac{1}{5}$ of the profit. If C invested Rs4,600 for 9 months, how much capital in total was invested by A?

SSC Phase-XIV (Graduation) 19 Sep 2026, Shift-I

(a) Rs1,800 (b) Rs2,000 (c) Rs1,500 (d) Rs2,100

03 X, Y and Z are three partners whose profit-sharing ratio is 5:7:8. If they invested their capital for 14 months, 8 months and 7 months respectively, what will be the ratio of their initial capital investment?

SSC Phase-XIV (Graduation) 22 Sep 2026, Shift-I

(a) 35:28:24 (b) 7:5:4
(c) 20:49:64 (d) 5:7:8

04 A and B invest in a business in the ratio 4 : 5. After 10 months, B withdraws his investment and leaves the business. In the first year, the business made a profit of Rs49,000. What is B's share?

SSC Phase-XIV (Graduation) 24 Sep 2026, Shift-I

(a) Rs25,000 (b) Rs20,000
(c) Rs24,000 (d) Rs22,000

05 Ravi started a business with an investment of Rs. 90,000 and after 4 months Krishna joined him by investing Rs. 1,50,000. If the profit at the end of the year is Rs. 66,500, find Krishna's profit.

SSC Phase-XIV (12th) 16 Sep 2026, Shift-II

(a) Rs. 31,500 (b) Rs. 35,000
(c) Rs. 27,500 (d) Rs. 21,500

06 Aman and Mahesh invest Rs. 65,000 and Rs. 78,000 for 1 year. What is the ratio of their profits?

SSC Phase-XIV (12th) 17 Sep 2026, Shift-II

(a) 5:6 (b) 5:8 (c) 7:6 (d) 6:7

07 A and B started a business with capitals of Rs32,000 and Rs48,000 respectively. B took a salary of Rs1,200 per month out of the profit for running the business. At the end of the year, they made a profit of Rs24,000. What is A's share in the profit?

SSC Phase-XIV (12th) 18 Sep 2026, Shift-II

(a) Rs9,200 (b) Rs3,540 (c) Rs6,000 (d) Rs3,840

08 Ram, Ravi and Rahim started a business. Ram invests 37.5% of the total capital, Ravi invests $66\frac{2}{3}\%$ of the remaining capital and Rahim invests the rest. If the total profit at the end of the year was Rs. 2,040, by how much is Ravi's profit more than Rahim's profit?

SSC Phase-XIV (12th) 19 Sep 2026, Shift-II

(a) Rs. 375 (b) Rs. 425 (c) Rs. 500 (d) Rs. 575

09 A and B started a business together by investing money in partnership. A invested $\frac{5}{9}$ of the total capital and kept his investment in the business for 48 months. At the end of the business period, the profit earned was divided between A and B and it was found that B's share in the profit was $\frac{3}{7}$ of the total profit. For how many months had B invested his money in the business?

SSC Phase-XIV (12th) 21 Sep 2026, Shift-II

(a) 42 months (b) 45 months
(c) 35 months (d) 24 months

10 Amit invests Rs26,000 for 6 months and Bablu invests Rs46,000 for 8 months. Find the ratio of their profits.

SSC Phase-XIV (12th) 22 Sep 2026, Shift-II

(a) 38:92 (b) 39:94 (c) 39:92 (d) 49:72

11 A, B and C invested their capitals in the ratio 3:4:5. The ratio of the time for which A, B and C invested is 2:1:4. If A gets a share of profit that is Rs8,500 more than B's profit, what is C's profit?

SSC Phase-XIV (12th) 23 Sep 2026, Shift-II

(a) Rs. 85,000 (b) Rs. 65,250
(c) Rs. 92,500 (d) Rs. 80,000

12 A, B and C start a business by investing a total of Rs4.5 lakh. A invests some amount, B invests Rs75,000 more than A, and C invests Rs30,000 less than B. After one year, the business earns a total profit of Rs16,200, which is to be shared among the partners in the ratio of their investments. Find C's profit.

SSC Phase-XIV (12th) 24 Sep 2026, Shift-II

(a) Rs4,580 (b) Rs6,500 (c) Rs5,580 (d) Rs6,540

13 Amit started a business with Rs70,000. Brijesh joined after 5 months with Rs40,000. At the end of the year, the total profit is Rs54,000.
What is Brijesh's share?

SSC Phase-XIV (12th) 25 Sep 2026, Shift-II

(a) Rs. 13,500 (b) Rs. 14,500
(c) Rs. 13,600 (d) Rs. 14,600

14 A, B and C invest Rs24,000, Rs36,000 and Rs12,000 respectively in a business. A is the working partner and receives 26.67% of the total profit for managing the business. The remaining profit is shared among A, B and C in the ratio of their capitals. At the end of the year, A's total share of the profit is Rs300 more than the combined share of B and C. Find the amount received by A.

SSC Phase-XIV (12th) 26 Sep 2026, Shift-I

(a) Rs7,500 (b) Rs6,500 (c) Rs6,900 (d) Rs5,600

15 A, B and C invest money in the ratio 2 : 3 : 5. A invests for 12 months, B for 8 months and C for 6 months. What is the ratio of their profits?

SSC Phase-XIV (Matric) 17 Sep 2026, Shift-III

(a) 2 : 1 : 5 (b) 2 : 4 : 5 (c) 4 : 4 : 5 (d) 3 : 1 : 5

Answer Key *SSC official key*

Partnership (Q. 01–15)

01	(c)	**02**	(a)	**03**	(c)	**04**	(a)	**05**	(b)	**06**	(a)	**07**	(d)	**08**	(b)	**09**	(b)	**10**	(c)
11	(a)	**12**	(c)	**13**	(a)	**14**	(c)	**15**	(c)										

Detailed Explanations रटना बंद, समझना शुरू

Partnership

01 **ANSWER (c)** 18 months

SSC Phase-XIV (Graduation) 17 Sep 2026, Shift-I

Concept: Capital-Months Ratio of profit = ratio of capital × time

X invested for 8 months, so X = 5 × 8 = 40. Let Y invest for m months, so Y = 4m

40 : 4m = 5 : 9, which gives 4m = 72 and m = 18
So Y's money stayed invested for **18 months**.

Note The question says "at the end of the year", yet the answer comes to more than 12 months. The wording is a little off, but the calculation gives 18 months only.

02 **ANSWER (a)** Rs1,800

SSC Phase-XIV (Graduation) 19 Sep 2026, Shift-I

Concept: Capital-Months Share of profit ∝ capital × time

C's share = $1-\frac{1}{7}-\frac{1}{5}=\frac{23}{35}$. So A : B : C = 5 : 7 : 23

C's capital-months = 4600 × 9 = 41400, which is 23 parts. So 1 part = 1800

A's capital-months = 5 × 1800 = 9000, and A's capital = $\frac{9000}{5}=1800$
So A invested **Rs1,800**.

Examiner's Trap Do not stop at 9000. That is A's capital-months, and you must divide it by A's 5 months.

03 **ANSWER (c)** 20:49:64

SSC Phase-XIV (Graduation) 22 Sep 2026, Shift-I

Rule: Capital = Profit/Time Profit ∝ capital × time, so capital ∝ profit ÷ time

X : Y : Z = $\frac{5}{14}:\frac{7}{8}:\frac{8}{7}$

Multiply all three by the LCM 56 and you get **20:49:64**.

Examiner's Trap If you multiply the profit ratio by time, you get wrong numbers like 70 : 56 : 56. To get capital, you have to divide.

04 **ANSWER (a)** Rs25,000

SSC Phase-XIV (Graduation) 24 Sep 2026, Shift-I

Concept: Capital-Months Ratio of profit = capital × time

A stayed for the full 12 months, B for only 10. A = 4 × 12 = 48, B = 5 × 10 = 50, so A : B = 24 : 25 (49 parts in all)

B's share = $\frac{25}{49}\times 49000=25000$, that is, **Rs25,000**.

05 **ANSWER (b)** Rs. 35,000

SSC Phase-XIV (12th) 16 Sep 2026, Shift-II

Concept: Capital-Months Ratio of profit = capital × time

Ravi: 90000 × 12, Krishna: 150000 × 8 (he came after 4 months). Ratio = 9 × 12 : 15 × 8 = 108 : 120 = 9 : 10

Krishna's profit = $\frac{10}{19}\times 66500=35000$
So Krishna gets **Rs. 35,000**.

Examiner's Trap Krishna's time is not 4 months. He joined after 4 months, so his money was invested for 12 − 4 = 8 months.

06 **ANSWER (a)** 5:6

SSC Phase-XIV (12th) 17 Sep 2026, Shift-II

Concept: Equal Time When the time is equal, ratio of profit = ratio of capital

65000 : 78000 = 65 : 78. Divide both by 13 and you are left with **5:6**.

07 **ANSWER (d)** Rs3,840

SSC Phase-XIV (12th) 18 Sep 2026, Shift-II

Concept: Deduct Salary First Take out the working partner's salary first, then divide the remaining profit in the ratio of capital.

B's yearly salary = 1200 × 12 = ₹14400. Remaining profit = 24000 − 14400 = ₹9600

Capital ratio A : B = 32 : 48 = 2 : 3. A's share =

$\frac{2}{5} \times 9600 = 3840$
The correct option is **Rs3,840**.

Examiner's Trap If you divide without deducting the salary, you get A = $\frac{2}{5} \times 24000 = 9600$, and the 9,200 option starts to look close. Deduct the salary first.

08 ANSWER (b) Rs. 425

SSC Phase-XIV (12th) 19 Sep 2026, Shift-II

Concept: Percent to Fraction 37.5% = $\frac{3}{8}$, $66\frac{2}{3}\% = \frac{2}{3}$

Take the total capital as 24 units. Ram = $\frac{3}{8} \times 24 = 9$, remaining = 15

Ravi = $\frac{2}{3} \times 15 = 10$, Rahim = 15 − 10 = 5. Ratio 9 : 10 : 5 (24 in all)

1 part = 2040 ÷ 24 = 85. Ravi − Rahim = (10 − 5) × 85 = **Rs. 425**

Examiner's Trap Ravi invested $\frac{2}{3}$ of the \"remaining capital\", not of the total capital. This is exactly where students go wrong.

09 ANSWER (b) 45 months

SSC Phase-XIV (12th) 21 Sep 2026, Shift-II

Concept: Capital-Months Ratio of profit = capital × time

Capital A : B = 5 : 4. B got 3/7, so A got 4/7, that is, profit A : B = 4 : 3

$\frac{5 \times 48}{4 \times t} = \frac{4}{3}$, so $16t = 720$ and t = 45
B's money stayed in the business for **45 months**.

10 ANSWER (c) 39:92

SSC Phase-XIV (12th) 22 Sep 2026, Shift-II

Concept: Capital-Months Ratio of profit = capital × time

Amit = 26 × 6 = 156, Bablu = 46 × 8 = 368

156 : 368. Divide both by 4 and you get **39:92**.

11 ANSWER (a) Rs. 85,000

SSC Phase-XIV (12th) 23 Sep 2026, Shift-II

Concept: Capital-Months Ratio of profit = capital × time

A : B : C = 3×2 : 4×1 : 5×4 = 6 : 4 : 20 = 3 : 2 : 10

A − B = 1 part = ₹8500. C has 10 parts, so C's profit = **Rs. 85,000**

12 ANSWER (c) Rs5,580

SSC Phase-XIV (12th) 24 Sep 2026, Shift-II

First find each person's amount. Let A = x, then B = x + 75000 and C = x + 45000

x + (x + 75000) + (x + 45000) = 450000, which gives 3x = 330000 and x = 110000. So C = ₹155000

C's profit = $\frac{155000}{450000} \times 16200 = \frac{31}{90} \times 16200 = 31 \times 180 = 5580$
So C gets **Rs5,580**.

13 ANSWER (a) Rs. 13,500

SSC Phase-XIV (12th) 25 Sep 2026, Shift-II

Concept: Capital-Months Ratio of profit = capital × time

Brijesh came after 5 months, so we count 7 months for him. Amit = 70 × 12 = 840, Brijesh = 40 × 7 = 280, that is, 3 : 1

Brijesh's share = $\frac{1}{4} \times 54000 = 13500$, that is, **Rs. 13,500**.

14 ANSWER (c) Rs6,900

SSC Phase-XIV (12th) 26 Sep 2026, Shift-I

Concept: Management Share 26.67% = $\frac{4}{15}$. This share goes to A first, then the remaining profit is divided in the ratio of capital.

To keep the calculation easy, take the total profit = 45k. Management share = $\frac{4}{15} \times 45k = 12k$, remaining = 33k

The capital ratio is 2 : 3 : 1. So out of 33k, A = 11k, B = 16.5k, C = 5.5k

A gets 12k + 11k = 23k in all, and B + C = 22k. The difference between the two is k = 300

A's amount = 23 × 300 = **Rs6,900**

15 ANSWER (c) 4 : 4 : 5

SSC Phase-XIV (Matric) 17 Sep 2026, Shift-III

Formula: Partnership In partnership, profit is always shared in the ratio of (capital × time).

A = 2 × 12 = 24, B = 3 × 8 = 24, C = 5 × 6 = 30

That gives 24 : 24 : 30. Divide everything by 6 and you are left with the ratio **4 : 4 : 5**.

Short Trick The product for A and B is 24 in both cases, so the first two terms of the answer must be equal. Only (C) has that among the options, so tick it straight away.

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12

CHAPTER

Mixture & Alligation

Questions *29 questions · 18 shifts*

Mixture & Alligation

Directions (Q. 01–29): *Choose the correct answer from the four given options.*

01 A jar contains a mixture of two liquids A and B in the ratio 3: 1. When 16 litres of the mixture is taken out and 9 litres of liquid B is poured into the jar, the ratio becomes 3: 4. How many litres of liquid A was there in the jar initially?

SSC Phase-XIV (Graduation) 17 Sep 2026, Shift-I

(a) 21 litres (b) 25 litres (c) 28 litres (d) 32 litres

02 A perfume seller mixes two perfumes costing Rs900/litre and Rs600/litre to prepare 240 litres of a mixture worth Rs750/litre. Due to poor packaging, 15 litres of perfume spills. How much of the Rs900/litre perfume was used?

SSC Phase-XIV (Graduation) 18 Sep 2026, Shift-I

(a) 100 (b) 110 (c) 120 (d) 130

03 A vessel contains 60 litres of a mixture of milk and water in the ratio 7:3. How many litres of the mixture should be taken out and replaced with pure water so that the ratio of milk and water in the resulting mixture becomes 7:5?

SSC Phase-XIV (Graduation) 18 Sep 2026, Shift-I

(a) 8 litres (b) 10 litres (c) 2 litres (d) 12 litres

04 A bucket contains a mixture of two liquids P and Q in the ratio 4 : 1. When 10 litres of the mixture is taken out and 10 litres of liquid Q is poured into the bucket, the ratio becomes 2 : 3. How many litres of liquid P was there in the bucket?

SSC Phase-XIV (Graduation) 19 Sep 2026, Shift-I

(a) 14 litres (b) 16 litres (c) 18 litres (d) 20 litres

05 A brine tank contains 100 litres of a 40% salt solution. Water is added to reduce it to 25%, but then 10 litres of pure water overflows. What was the volume of water added?

SSC Phase-XIV (Graduation) 21 Sep 2026, Shift-I

(a) 60 (b) 65 (c) 70 (d) 75

06 A vessel contains 100 litres of a mixture of milk and water in the ratio 4:1. First, 20 litres of the mixture is taken out and replaced with the same amount of pure water. Then, 25 litres of this new mixture is taken out and replaced with the same amount of pure milk. What is the final ratio of milk and water in the vessel?

SSC Phase-XIV (Graduation) 21 Sep 2026, Shift-I

(a) 17 : 8 (b) 73 : 27 (c) 19 : 6 (d) 21 : 8

07 A bucket contains a mixture of two liquids P and Q in the ratio 5: 2. If 14 litres of the mixture is taken out and 7 litres of liquid Q is added to the bucket, the ratio of P and Q becomes 2: 1. Find the initial quantity of liquid P in the bucket.

SSC Phase-XIV (Graduation) 22 Sep 2026, Shift-I

(a) 30 litres (b) 50 litres
(c) 80 litres (d) 100 litres

08 In three solutions, the ratio of acid to water is 1:2, 2:3 and 3:2 respectively. Equal quantities of the first two solutions and double the quantity of the third solution are mixed together. What is the ratio of acid to water in the final mixture?

SSC Phase-XIV (Graduation) 23 Sep 2026, Shift-I

(a) 29 : 31 (b) 11 : 14 (c) 17 : 23 (d) 15 : 19

09 Plastic and leather are two types of materials used to make industrial washers. How many kg of pure plastic must be added to a mixture of 16 kg of the first washer material and 25 kg of the second washer material to prepare a new batch containing exactly 40% leather? By weight, the ratio of plastic to leather in the first material is 3 : 1 and in the second material it is 6 : 19.

SSC Phase-XIV (Graduation) 24 Sep 2026, Shift-I

(a) 19.5 kg (b) 18.5 kg (c) 17.5 kg (d) 16.5 kg

10 A cleaning services company uses 75-litre drums of industrial bleach (20% concentration) for commercial cleaning. After 15 litres is accidentally spilled, the drum is topped up with pure water. To stay within chemical exposure norms for indoor use, the dilution must be recalculated exactly. What is the new percentage of bleach concentration?

SSC Phase-XIV (Graduation) 25 Sep 2026, Shift-I

(a) 15% (b) 16% (c) 17% (d) 18%

11 A vessel contains 200 litres of a mixture of milk and water in the ratio 3:2. First, 40 litres of the mixture is taken out and the same quantity of pure water is added. Then, 50 litres is taken out of the resulting mixture and the same quantity of pure milk is added. Find the final ratio of milk and water in the vessel.

SSC Phase-XIV (Graduation) 25 Sep 2026, Shift-I

(a) 109 : 66 (b) 111 : 64
(c) 61 : 39 (d) 47 : 30

12 A bottle contains 80 litres of a honey-water mixture, and 25% of the mixture is pure honey. Some more pure honey is added to the bottle so that the final mixture has 60% honey. How much pure honey must be added to get this new concentration?

SSC Phase-XIV (12th) 16 Sep 2026, Shift-II

(a) 50 litres (b) 90 litres (c) 70 litres (d) 71 litres

13 Each of five identical vessels has a capacity C. The quantities of milk in them are in the ratio 2 : 3 : 4 : 5 : 6. The total milk is $\frac{4}{7}$ of the combined capacity of all five vessels. How many vessels are at least half full of milk?

SSC Phase-XIV (12th) 16 Sep 2026, Shift-II

(a) 2 (b) 3 (c) 4 (d) 5

14 A 70 kg mixture of sand and gravel contains 55% gravel. How much gravel must be added to it to make the mixture 65% gravel?

SSC Phase-XIV (12th) 17 Sep 2026, Shift-II

(a) 30 kg (b) 35 kg (c) 20 kg (d) 25 kg

15 A milkman has 20 litres of milk. He adds 5 litres of water to it. What is the percentage of water in the mixture?

SSC Phase-XIV (12th) 17 Sep 2026, Shift-II

(a) 20% (b) 40% (c) 60% (d) 80%

16 A vessel contains a mixture of milk and water in the ratio 9:4. On adding 35 litres of water, the ratio gets reversed and the vessel becomes completely full. What is the capacity of the vessel?

SSC Phase-XIV (12th) 18 Sep 2026, Shift-II

(a) 75 litres (b) 69 litres (c) 63 litres (d) 84 litres

17 Two mixtures of equal quantity are mixed together. In the first mixture the ratio of milk to water is 5:3, and in the second mixture the ratio of milk to water is 7:5. What is the ratio of milk to water in the final mixture?

SSC Phase-XIV (12th) 18 Sep 2026, Shift-II

(a) 29 : 19 (b) 17 : 11 (c) 19 : 29 (d) 31 : 17

18 A milkman mixes 40 litres of water in 80 litres of milk. After selling 25% of this mixture, he adds water to make up for the quantity sold. What is the present ratio of water to milk?

SSC Phase-XIV (12th) 19 Sep 2026, Shift-II

(a) 2 : 1 (b) 1 : 2 (c) 1 : 1 (d) 2 : 3

19 In a 96-litre solution of milk and water in which the ratio of milk to water is 5:3, how much water should be added to get a final ratio of 3:2?

SSC Phase-XIV (12th) 21 Sep 2026, Shift-II

(a) 6 litres (b) 5 litres (c) 4 litres (d) 7 litres

20 You have 90 ml of a sugar solution that contains 38% sugar. How much pure water should be added to it so that the final solution contains

17.1% sugar?

SSC Phase-XIV (12th) 22 Sep 2026, Shift-II

(a) 90 ml (b) 110 ml (c) 140 ml (d) 160 ml

21 A vessel contains 120 litres of a mixture of spirit and water in the ratio 7: 5. Some litres of the mixture are taken out and replaced with the same quantity of water. Then 24 litres of pure spirit is added. If the final ratio of spirit to water becomes 5: 4, how many litres of the mixture were taken out?

SSC Phase-XIV (12th) 22 Sep 2026, Shift-II

(a) 18 litres (b) 21 litres (c) 30 litres (d) 24 litres

22 A milkman has two types of milk. The percentage of milk in the first vessel is 70% and in the second vessel it is 85%. If he mixes 35 litres from the first vessel with 75 litres from the second vessel, what is the percentage of milk in the mixture?

SSC Phase-XIV (12th) 23 Sep 2026, Shift-II

(a) 74.88% (b) 89.4% (c) 75.6% (d) 80.2%

23 Two alloys P and Q are made of metals X, Y and Z. In P, the ratio of the masses of X:Y:Z is 2:3:5, and in Q it is 3:5:7. If 12 kg of P and 18 kg of Q are melted together to form a new alloy R, find the ratio of the masses of X:Y:Z in R.

SSC Phase-XIV (12th) 24 Sep 2026, Shift-II

(a) 5 : 8 : 12 (b) 13 : 22 : 32
(c) 12 : 21 : 31 (d) 15 : 25 : 35

24 In a 104-litre solution of milk and water in which the ratio of milk to water is 8:5, what quantity of water should be added to it to get a final ratio of 4:3?

SSC Phase-XIV (12th) 24 Sep 2026, Shift-II

(a) 8 litres (b) 7 litres (c) 6 litres (d) 9 litres

25 A container has a mixture of salt and water in which 8% of the mixture is salt. Some water evaporates, but the amount of salt remains the same. After 12 litres of water evaporates, the salt concentration rises to 20%. What was the initial volume (in litres) of the salt-water solution?

SSC Phase-XIV (12th) 24 Sep 2026, Shift-II

(a) 24 litres (b) 18 litres (c) 20 litres (d) 21 litres

26 In a 45-litre mixture, the ratio of milk to water is 7: 2. Some litres of water are added to it. After that, the same number of litres of the new mixture is taken out. If the final ratio of milk to water becomes 5: 4, how many litres of water were added?

SSC Phase-XIV (12th) 25 Sep 2026, Shift-II

(a) 12 litres (b) 15 litres (c) 18 litres (d) 21 litres

27 A vessel contains 96 litres of a mixture of milk and water in the ratio 5: 3. x litres of water is added to it. Then 24 litres is taken out of the resulting mixture and replaced with 24 litres of pure milk. If the final ratio of milk to water is 3: 2, find x.

SSC Phase-XIV (12th) 25 Sep 2026, Shift-II

(a) 12 litres (b) 18 litres (c) 24 litres (d) 30 litres

28 A shopkeeper mixes two types of tea, one at Rs75/kg and the other at Rs105/kg, in the ratio 3:2. Find the cost price per kg of this tea mixture.

SSC Phase-XIV (12th) 26 Sep 2026, Shift-I

(a) Rs89/kg (b) Rs97/kg
(c) Rs77/kg (d) Rs87/kg

29 A can has a capacity of 300 litres and is completely filled with pure milk. 30 litres of milk is taken out of this can and the same quantity (30 litres) of water is added to fill the can again. This process of taking out 30 litres of the mixture and replacing it with 30 litres of water is repeated several times. After repeating the process a certain number of times, the quantity of pure milk left in the can drops to 218.7 litres. How many times must this process be carried out for the quantity of pure milk to be 218.7 litres?

SSC Phase-XIV (12th) 26 Sep 2026, Shift-I

(a) 2 (b) 3 (c) 4 (d) 5

Answer Key *SSC official key*

Mixture & Alligation (Q. 01–29)

01	(a)	02	(c)	03	(b)	04	(b)	05	(c)	06	(b)	07	(c)	08	(a)	09	(d)	10	(b)
11	(c)	12	(c)	13	(b)	14	(c)	15	(a)	16	(c)	17	(a)	18	(c)	19	(c)	20	(b)
21	(d)	22	(d)	23	(a)	24	(a)	25	(c)	26	(c)	27	(c)	28	(d)	29	(b)		

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Mixture & Alligation

01 **ANSWER (a)** 21 litres

SSC Phase-XIV (Graduation) 17 Sep 2026, Shift-I

Concept: Removing Mixture When you take out some mixture, both liquids come out in the same old ratio.

Let A = $3k$ litres and B = k litres. The 16 litres removed will be in 3 : 1, that is, 12 litres of A and 4 litres of B.

Left: A = $3k-12$, and after pouring 9 litres into B, B = $k-4+9=k+5$

$\frac{3k-12}{k+5}=\frac{3}{4} \Rightarrow 12k-48=3k+15 \Rightarrow 9k=63,\ k=7$

At the start, A = $3\times7=21$, so the answer is **21 litres**.

Examiner's Trap 28 litres (option C) is the whole mixture. The question asks only for liquid A, so don't mark 28 in a hurry.

02 **ANSWER (c)** 120

SSC Phase-XIV (Graduation) 18 Sep 2026, Shift-I

Rule: Alligation Costlier : Cheaper = (Mean − Cheaper) : (Costlier − Mean)

₹900 : ₹600 = (750 − 600) : (900 − 750) = 150 : 150, that is, 1 : 1

So half of the 240 litres is the ₹900 perfume:

$\frac{240}{2}=120$ litres

The 15 litres spilled after the mixture was made. It has no effect on how much perfume was used. So the answer is **120**.

Examiner's Trap The 15-litre line is there only to confuse you. Subtract it and you land on a wrong option.

03 **ANSWER (b)** 10 litres

SSC Phase-XIV (Graduation) 18 Sep 2026, Shift-I

Concept: Replacement Whatever you take out, the same amount of water goes back in, so the total stays the same. Only milk goes down.

At first there are 42 litres of milk and 18 litres of water. The total will still be 60 litres at the end.

The new ratio is 7 : 5, so milk = $\frac{7}{12}\times60=35$ litres

So milk went down by 7 litres. The mixture taken out was 70% milk, so $0.7x=7$, which gives x = **10 litres**.

04 **ANSWER (b)** 16 litres

SSC Phase-XIV (Graduation) 19 Sep 2026, Shift-I

Let P = $4k$ and Q = k. The 10 litres will come out in 4 : 1, so 8 litres of P and 2 litres of Q went out.

Now P = $4k-8$, and Q = $k-2+10=k+8$

$\frac{4k-8}{k+8}=\frac{2}{3} \Rightarrow 12k-24=2k+16 \Rightarrow k=4$

At the start, P = $4\times4=16$, that is, **16 litres**.

Short Trick 10 litres out, 10 litres in, so the total stayed at 20 litres. At the end P = 2/5 of 20 = 8 litres. P dropped by 8 only during removal, so P was 16 at the start.

05 **ANSWER (c)** 70

SSC Phase-XIV (Graduation) 21 Sep 2026, Shift-I

Concept: Salt Stays Fixed Whether water is added or water spills, the amount of salt stays the same.

Salt = 40% × 100 = 40 litres

At the end the same 40 litres is 25%, so final volume $= \frac{40}{0.25} = 160$ litres

Let W litres of water be added: $100 + W - 10 = 160 \Rightarrow W = 70$. The right option is **70**.

Examiner's Trap Writing 160 − 100 = 60 straight away is the trap. The 10 litres that overflowed also had to be made up by the added water, so it is 70.

06 **ANSWER (b)** 73 : 27

SSC Phase-XIV (Graduation) 21 Sep 2026, Shift-I

At the start there are 80 litres of milk and 20 litres of water.

20 litres (20%) taken out leaves 64 milk and 16 water. Then 20 litres of water goes in, so now milk is 64 and water is 36.

Now 25 litres (25%) comes out: milk $64 \times 0.75 = 48$, water $36 \times 0.75 = 27$.

Adding 25 litres of milk makes milk 73, with water at 27. Ratio **73 : 27**.

Short Trick The total stays at 100 litres, so the two terms of the answer must add up to 100. Only 73 : 27 does that among the options.

07 **ANSWER (c)** 80 litres

SSC Phase-XIV (Graduation) 22 Sep 2026, Shift-I

Let P = $5k$, Q = $2k$. The 14 litres came out in 5 : 2, that is, 10 litres of P and 4 litres of Q.

P left = $5k - 10$, and after adding 7 litres of Q, Q = $2k - 4 + 7 = 2k + 3$

$5k - 10 = 2(2k + 3) \Rightarrow k = 16$

So at the start P = $5 \times 16 = 80$ litres. The answer is **80 litres**.

08 **ANSWER (a)** 29 : 31

SSC Phase-XIV (Graduation) 23 Sep 2026, Shift-I

Concept: Quantities via LCM Take each solution's quantity based on the LCM of the ratio sums (3, 5, 5). That way no fractions come in.

LCM(3, 5, 5) = 15. The first two solutions are 15 litres each and the third is double, that is, 30 litres.

Acid: $\frac{1}{3} \times 15 + \frac{2}{5} \times 15 + \frac{3}{5} \times 30 = 5 + 6 + 18 = 29$

The total is 60, so water = 60 − 29 = 31. Acid : water = **29 : 31**.

09 **ANSWER (d)** 16.5 kg

SSC Phase-XIV (Graduation) 24 Sep 2026, Shift-I

Concept: Leather Stays Fixed Adding plastic does not change the amount of leather.

Leather in the first material (16 kg, 3 : 1) = $\frac{1}{4} \times 16 = 4$ kg

Leather in the second material (25 kg, 6 : 19) = 19 kg

Together the total is 41 kg, of which 23 kg is leather.

Now this 23 kg must be 40% of the whole: new total $= \frac{23}{0.4} = 57.5$ kg

So the plastic to be added is 57.5 − 41 = **16.5 kg**.

10 **ANSWER (b)** 16%

SSC Phase-XIV (Graduation) 25 Sep 2026, Shift-I

Formula: Replacement New concentration = old $\times\left(1 - \frac{x}{V}\right)$

15 litres spilled and 15 litres of water went in, so $\frac{x}{V} = \frac{15}{75} = \frac{1}{5}$

New concentration = $20\% \times \frac{4}{5} = 16\%$

Check it: bleach dropped from 15 to 12 litres in a total of 75, and 12/75 = 16%.

The right choice is **16%**.

11 **ANSWER (c)** 61 : 39

SSC Phase-XIV (Graduation) 25 Sep 2026, Shift-I

At the start, milk is 120 and water is 80 litres.

40 litres (20%) taken out: milk 96, water 64. Then 40 litres of water goes in, so milk 96, water 104.

Now 50 litres (25%) comes out: milk $96 \times 0.75 = 72$, water $104 \times 0.75 = 78$.

50 litres of milk is added and milk becomes 122. Divide 122 : 78 by 2 and you get **61 : 39**.

Short Trick The total stays at 200, so the sum of the ratio terms must be a factor of 200. 61 + 39 = 100 fits, while the sums of the other options (175, 175, 77) do not.

12 **ANSWER (c)** 70 litres

SSC Phase-XIV (12th) 16 Sep 2026, Shift-II

Concept: Water Stays Fixed Adding honey does not change the amount of water.

Water = 75% × 80 = 60 litres

At the end honey is 60%, so water is 40%. New total = $\frac{60}{0.4}$ = 150 litres

Honey added = 150 − 80 = **70 litres**.

13 **ANSWER (b)** 3

SSC Phase-XIV (12th) 16 Sep 2026, Shift-II

The five vessels together hold $5C$, so total milk = $\frac{4}{7}\times 5C=\frac{20C}{7}$

Take the milk as $2m, 3m, 4m, 5m, 6m$. The sum is $20m=\frac{20C}{7} \Rightarrow m=\frac{C}{7}$

So the vessels hold: $\frac{2C}{7}, \frac{3C}{7}, \frac{4C}{7}, \frac{5C}{7}, \frac{6C}{7}$

Half a vessel = $\frac{C}{2}=\frac{3.5C}{7}$. The ones filled above this are $\frac{4C}{7}, \frac{5C}{7}, \frac{6C}{7}$, that is, **3** vessels.

14 **ANSWER (c)** 20 kg

SSC Phase-XIV (12th) 17 Sep 2026, Shift-II

Concept: Sand Stays Fixed When gravel is added, the sand stays the same.

Sand = 45% × 70 = 31.5 kg

Gravel has to become 65%, so sand will be 35%. New total = $\frac{31.5}{0.35}$ = 90 kg

So the gravel to be added is 90 − 70 = **20 kg**.

15 **ANSWER (a)** 20%

SSC Phase-XIV (12th) 17 Sep 2026, Shift-II

The total mixture is 20 + 5 = 25 litres, and 5 litres of it is water.

Water % = $\frac{5}{25}\times 100=20\%$, so the answer is **20%**.

Examiner's Trap Taking $\frac{5}{20}=25\%$ is a mistake. The percentage is worked out on the whole mixture (25 litres), not on the milk alone.

16 **ANSWER (c)** 63 litres

SSC Phase-XIV (12th) 18 Sep 2026, Shift-II

Let milk be $9k$ and water $4k$. After adding water, the ratio reverses to 4 : 9.

Milk does not change: $\frac{9k}{4k+35}=\frac{4}{9} \Rightarrow 81k=16k+140$

$\Rightarrow k=\frac{140}{65}=\frac{28}{13}$

The original mixture was $13k=28$ litres. Capacity of the vessel = $28+35=63$, that is, **63 litres**.

Short Trick Make the milk equal: 9 : 4 = 36 : 16 and 4 : 9 = 36 : 81. Water went up by 65 units, which is 35 litres, so 1 unit = 7/13. The final total of 117 units = 63 litres.

17 **ANSWER (a)** 29 : 19

SSC Phase-XIV (12th) 18 Sep 2026, Shift-II

Concept: Equal Quantities First make the sums of both ratios equal (using the LCM), then add.

5 : 3 adds up to 8 and 7 : 5 adds up to 12. Taking the LCM 24, they become 15 : 9 and 14 : 10.

Milk = 15 + 14 = 29, water = 9 + 10 = 19. Ratio **29 : 19**.

Examiner's Trap Adding directly as (5+7) : (3+5) = 12 : 8 is wrong, because the two ratio sums are different. Also note the reversed option 19 : 29 sitting close by, so read carefully.

18 **ANSWER (c)** 1 : 1

SSC Phase-XIV (12th) 19 Sep 2026, Shift-II

The total mixture is 120 litres, with 80 of milk and 40 of water.

Selling 25% cuts both by 25%: 60 of milk and 30 of water are left. He sold 30 litres.

He adds 30 litres of water, so now water is 60 and milk is also 60. Water : milk = **1 : 1**.

19 **ANSWER (c)** 4 litres

SSC Phase-XIV (12th) 21 Sep 2026, Shift-II

Milk = $\frac{5}{8}\times 96=60$ litres, and the remaining 36 litres is water.

Adding water will not change the milk. With milk at 60 in a 3 : 2 ratio, water should be $60\times\frac{2}{3}=40$ litres.

So you only need to add 40 − 36 = **4 litres** more

water.

20 **ANSWER (b)** 110 ml

SSC Phase-XIV (12th) 22 Sep 2026, Shift-II

Concept: Sugar Stays Fixed $C_1V_1 = C_2V_2$, because adding water does not change the amount of sugar.

Sugar = $0.38 \times 90 = 34.2$ ml

This same 34.2 ml is now 17.1%, so new volume = $\frac{34.2}{0.171} = 200$ ml

Water to be added = 200 − 90 = **110 ml**.

21 **ANSWER (d)** 24 litres

SSC Phase-XIV (12th) 22 Sep 2026, Shift-II

At the start, spirit is 70 and water is 50 litres. Removing and refilling with water keeps the total at 120. Then 24 litres of spirit goes in, so the total becomes 144 litres.

At the end, spirit = $\frac{5}{9} \times 144 = 80$ litres. That means spirit was 56 litres before the 24 was added.

Removing x litres reduced the spirit: $\frac{7}{12}x = 70 - 56 = 14 \Rightarrow x = 24$. So **24 litres** was taken out.

22 **ANSWER (d)** 80.2%

SSC Phase-XIV (12th) 23 Sep 2026, Shift-II

Formula: Weighted Average Average % = $\frac{p_1q_1 + p_2q_2}{q_1 + q_2}$

Milk from the first vessel is $0.70 \times 35 = 24.5$ litres and from the second $0.85 \times 75 = 63.75$ litres. Total milk is 88.25 litres.

The total mixture is 110 litres. Milk % = $\frac{88.25}{110} \times 100 \approx 80.2\%$, so option **80.2%** is correct.

Short Trick The answer will lie between 70% and 85%, and it will lean towards 85% because 75 litres is more than 35. Only 80.2% meets this condition among the options.

23 **ANSWER (a)** 5 : 8 : 12

SSC Phase-XIV (12th) 24 Sep 2026, Shift-II

In P (12 kg, ratio sum 10): X = 2.4, Y = 3.6, Z = 6 kg

In Q (18 kg, ratio sum 15): X = 3.6, Y = 6, Z = 8.4 kg

Add them for R: X = 6, Y = 9.6, Z = 14.4. Divide all by 1.2 and you get **5 : 8 : 12**.

Short Trick R weighs 30 kg in all. 5 + 8 + 12 = 25, and 25 × 1.2 = 30, so you can check the option and confirm it at once.

24 **ANSWER (a)** 8 litres

SSC Phase-XIV (12th) 24 Sep 2026, Shift-II

Milk = $\frac{8}{13} \times 104 = 64$ litres, and water is 40 litres.

Milk stays the same. If milk is 64 in a 4 : 3 ratio, water needed = $64 \times \frac{3}{4} = 48$ litres.

Right now it is 40, so 48 − 40 = **8 litres** of water has to be added.

25 **ANSWER (c)** 20 litres

SSC Phase-XIV (12th) 24 Sep 2026, Shift-II

Concept: Salt Stays Fixed $C_1V_1 = C_2V_2$

Let the starting volume be V. After 12 litres evaporates, salt becomes 20%: $0.08V = 0.20(V - 12)$

$0.08V = 0.2V - 2.4 \Rightarrow 0.12V = 2.4 \Rightarrow V = 20$, which is **20 litres**.

Short Trick Going from 8% to 20% means the concentration became 2.5 times. So 1/2.5 = 2/5 of the volume is left and 3/5 evaporated. This 3/5 is the 12 litres, so V = 20.

26 **ANSWER (c)** 18 litres

SSC Phase-XIV (12th) 25 Sep 2026, Shift-II

Concept: Removal and Ratio Taking out some mixture does not change the milk : water ratio.

Milk is 35 litres and water is 10 litres. The later removal will not change the ratio, so the ratio must already be 5 : 4 right after the water is added.

$\frac{35}{10 + w} = \frac{5}{4} \Rightarrow 10 + w = 28 \Rightarrow w = 18$. Water added was **18 litres**.

27 **ANSWER (c)** 24 litres

SSC Phase-XIV (12th) 25 Sep 2026, Shift-II

Milk is 60 and water is 36 litres. Adding x litres of water makes total = $96 + x$ and water = $36 + x$

24 litres out and 24 litres of milk in, so the total is

still $96+x$. Water now = $(36+x)\times\frac{72+x}{96+x}$

This water is $\frac{2}{5}$ of the total:

$5(36+x)(72+x)=2(96+x)^2 \Rightarrow x^2+52x-1824=0$

$(x-24)(x+76)=0 \Rightarrow x=24$. So it is **24 litres**.

Short Trick In the exam, skip the quadratic and try the options. At $x=24$ the total is 120 and water is 60. Taking out 24 litres, that is 1/5, leaves 48 of water, and adding milk makes milk 72. 72 : 48 = 3 : 2, and it fits.

28 ANSWER (d) Rs87/kg

SSC Phase-XIV (12th) 26 Sep 2026, Shift-I

Formula: Weighted Average Average price = $\frac{p_1q_1+p_2q_2}{q_1+q_2}$

Average = $\frac{3\times75+2\times105}{3+2}=\frac{225+210}{5}=\frac{435}{5}=87$

So the cost price of the mixture is **Rs87/kg**.

Short Trick The difference between the two is 30. Add $\frac{2}{5}$ of it to 75: $75+30\times\frac{2}{5}=87$

29 ANSWER (b) 3

SSC Phase-XIV (12th) 26 Sep 2026, Shift-I

Formula: Repeated Removal Milk left = $V\left(1-\frac{x}{V}\right)^n$

$300\left(1-\frac{30}{300}\right)^n=218.7 \Rightarrow 0.9^n=\frac{218.7}{300}=0.729$

$0.729=0.9^3$, so $n=3$. The process was done **3** times.

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13
CHAPTER

Time & Work

Questions *38 questions · 16 shifts*

Time & Work

Directions (Q. 01–38): *Choose the correct answer from the four given options.*

01 A and B can do a piece of work in 35 days and 42 days respectively. They started the work together, but after some time A left and B completed the remaining work in 9 days. After how many days did A leave the work?

SSC Phase-XIV (12th) 16 Sep 2026, Shift-II

(a) 14 days (b) 13 days (c) 12 days (d) 15 days

02 P can complete a piece of work in 25 days more than Q, while P completes the same work in 45 days more than R. If P and Q work together, they can complete the work in the same time in which R alone can complete it. How many days will P alone take to complete the work?

SSC Phase-XIV (12th) 16 Sep 2026, Shift-II

(a) 15 days (b) 20 days (c) 30 days (d) 75 days

03 Raj can complete 44.44% of a piece of work in 36 days. He works for 24 days and then Karan alone completes the remaining work in 38 days. In how many days will both together complete half of the same work?

SSC Phase-XIV (12th) 18 Sep 2026, Shift-II

(a) 14.2 days (b) 8.5 days
(c) 16.2 days (d) 11.8 days

04 A man works twice as fast as a woman, and a woman works twice as fast as a child. If 18 men can complete a piece of work in 10 days, how many days will 36 women and 72 children together take to complete the same work?

SSC Phase-XIV (12th) 18 Sep 2026, Shift-II

(a) 6 days (b) 8 days (c) 5 days (d) 7 days

05 Ravi is three times as efficient as Krishna in doing work. If both of them together can complete a work in 28 days, then in how many days will Ravi alone complete the work?

SSC Phase-XIV (12th) 19 Sep 2026, Shift-II

(a) 37.33 days (b) 45.25 days
(c) 39 days (d) 28 days

06 The ratio of the efficiencies of P and Q is 9 : 5. Working together, they can complete a certain work in $7\frac{1}{2}$ days. P alone completes $\frac{3}{7}$ of the work and after that Q alone completes the remaining work. In how many days was the whole work finished?

SSC Phase-XIV (12th) 19 Sep 2026, Shift-II

(a) 12 days (b) 15 days (c) 17 days (d) 18 days

07 26 men can do a piece of work in 45 days. How many men will be required to do the same work in 15 days?

SSC Phase-XIV (12th) 21 Sep 2026, Shift-II

(a) 78 (b) 68 (c) 48 (d) 58

08 The ratio of the efficiencies of A and B is 7:5. A alone can complete the work in 55 days. How much time will B take to complete it alone?

SSC Phase-XIV (12th) 21 Sep 2026, Shift-II

(a) 77 days (b) 67 days (c) 57 days (d) 54 days

09 Ravi and Krishna, working together, can

complete a work in 7 days. If Ravi works at three times his actual efficiency and Krishna works at $\frac{1}{4}$ of his actual efficiency, the work would be completed in 4 days. In how many days can Krishna alone complete the work?

SSC Phase-XIV (12th) 21 Sep 2026, Shift-II

(a) 12.5 days (b) 15.4 days
(c) 14.5 days (d) 13.5 days

10 A, B and C can do a work in 12 days, 18 days and 24 days, respectively. They all start the work together, but A leaves after 3 days and B leaves 4 days before the completion of the work. In how many days is the work completed?

SSC Phase-XIV (12th) 21 Sep 2026, Shift-II

(a) 12 days (b) 10 days (c) 15 days (d) 20 days

11 A and B can do a piece of work in 28 days. B alone can do 83.33% of the same work in 25 days. In how many days can A alone do 8/15th of the same work?

SSC Phase-XIV (12th) 23 Sep 2026, Shift-II

(a) 124 days (b) 150 days
(c) 224 days (d) 228 days

12 Rohit started a work and continued it for 6 days. After that he had to leave, so Suresh was called and he completed the remaining work in 24 days. If instead Rohit had worked for 9 days before leaving, Suresh would have completed the remaining work in only 12 days. In how many days can Rohit alone finish the whole work?

SSC Phase-XIV (12th) 23 Sep 2026, Shift-II

(a) 48 days (b) 12 days (c) 36 days (d) 24 days

13 Ravi, Suresh and Mahesh work in a juice unit. Ravi takes 2 hours to extract the amount of juice that Suresh can extract in 3 hours. Mahesh takes 6 hours to extract the amount of juice that Ravi extracts in 4 hours. Working together, they fill a storage tank in 6 hours. How much time will Mahesh alone take to fill the tank?

SSC Phase-XIV (12th) 24 Sep 2026, Shift-II

(a) 18 hours (b) 14 hours
(c) 21 hours (d) 25 hours

14 A, B and C are employed to do a work for Rs529. A and B together do $\frac{19}{23}$ of the work and B and C together do $\frac{8}{23}$ of the work. What amount should be paid to A?

SSC Phase-XIV (12th) 24 Sep 2026, Shift-II

(a) Rs450 (b) Rs275 (c) Rs345 (d) Rs425

15 A company deploys 500 workers to restore the wall of an old fort. In the first 15 weeks, they manage to restore 2/5 of the total structure. Suddenly, a severe storm hits the area, due to which the restoration work stops for 6 weeks. During this period of inactivity, 1/2 of the already restored part collapses due to storm damage. When the weather clears and restoration resumes, only 360 workers return to work. Assuming no further disruption, in how many weeks from the start will the entire restoration project be completed?

SSC Phase-XIV (12th) 26 Sep 2026, Shift-I

(a) 42.33 weeks (b) 57.23 weeks
(c) 62.67 weeks (d) 55.25 weeks

16 Three persons, working individually, can build a wall in 12 hours, 15 hours and 20 hours, respectively. However, if they work together, they lay 340 fewer bricks per hour than the sum of their individual rates and complete the wall in 15 hours. Find the total number of bricks in the wall.

SSC Phase-XIV (12th) 26 Sep 2026, Shift-I

(a) 2700 (b) 3250 (c) 2550 (d) 3200

17 A is twice as efficient as B, and B is 50% more efficient than C. If A, B and C together complete a work in 12 days, then in how many days can B alone complete the work?

SSC Phase-XIV (12th) 26 Sep 2026, Shift-I

(a) 36 days (b) 40 days (c) 49 days (d) 44 days

18 In a camp, food provisions are sufficient for 24 persons for 16 days. For how many days will the same provisions be sufficient for 12 persons?

SSC Phase-XIV (Matric) 16 Sep 2026, Shift-III

(a) 32 days (b) 34 days (c) 31 days (d) 36 days

19 A can do a work in 18 days. B can do the same work in 9 days. How much more work does B do than A in 1 day?

SSC Phase-XIV (Matric) 16 Sep 2026, Shift-III

(a) $\frac{1}{18}$ (b) $\frac{1}{12}$ (c) $\frac{1}{9}$ (d) $\frac{2}{9}$

20 7 labourers take 20 weeks to build a house. How much time will 10 labourers take to build the same house?

SSC Phase-XIV (Matric) 17 Sep 2026, Shift-III

(a) 7 weeks (b) 10 weeks
(c) 12 weeks (d) 14 weeks

21 A and B together can complete a work in 4 days. What part of the work is left after working together for 1 day?

SSC Phase-XIV (Matric) 17 Sep 2026, Shift-III

(a) $\frac{1}{4}$ (b) $\frac{1}{2}$ (c) $\frac{3}{4}$ (d) $\frac{2}{3}$

22 A contractor planned to complete a work in 24 days with 15 labourers. After 8 days, 5 more labourers joined and all the labourers worked at the same rate. In how many days in total was the work completed?

SSC Phase-XIV (Matric) 17 Sep 2026, Shift-III

(a) 18 days (b) 20 days (c) 21 days (d) 22 days

23 In a camp, food is sufficient for 22 persons for 36 days. For how many days will the same food be sufficient for 33 persons?

SSC Phase-XIV (Matric) 18 Sep 2026, Shift-III

(a) 23 days (b) 26 days (c) 24 days (d) 28 days

24 A group of workers, working 6 hours per day, can complete a work in 27 days. If they work 9 hours per day, in how many days will the same work be completed?

SSC Phase-XIV (Matric) 18 Sep 2026, Shift-III

(a) 22 days (b) 18 days (c) 17 days (d) 20 days

25 A can complete a homework chart in 6 days. Working alone at the same rate, how much work does A complete in 2 days?

SSC Phase-XIV (Matric) 18 Sep 2026, Shift-III

(a) 1/4 (b) 1/3 (c) 1/2 (d) 2/3

26 A group of 12 labourers can complete a work in 9 days. After working for 6 days, 6 additional labourers join the group. Determine the number of days required to complete the remaining work.

SSC Phase-XIV (Matric) 19 Sep 2026, Shift-III

(a) 4 days (b) 2 days (c) 6 days (d) 8 days

27 A can complete $\frac{3}{5}$ of a work in 9 days. In how many days can A complete the whole work?

SSC Phase-XIV (Matric) 19 Sep 2026, Shift-III

(a) 12 days (b) 14 days (c) 15 days (d) 18 days

28 If 5 labourers can complete $\frac{2}{3}$ of a work in 12 days, then how many labourers will be required to complete the whole work in 15 days?

SSC Phase-XIV (Matric) 19 Sep 2026, Shift-III

(a) 5 (b) 6 (c) 7 (d) 8

29 15 machines make a certain order in 27 days. In how many days will 45 identical machines make the same order?

SSC Phase-XIV (Matric) 21 Sep 2026, Shift-III

(a) 14 days (b) 9 days (c) 8 days (d) 11 days

30 27 workers can complete a work in 20 days. If the work rate per worker remains the same, in how many days will 45 workers complete the same work?

SSC Phase-XIV (Matric) 21 Sep 2026, Shift-III

(a) 11 days (b) 12 days (c) 16 days (d) 14 days

31 A can paint a wall in 8 days and B can paint the same wall in 12 days. If they work together, what part of the wall will they paint in 1 day?

SSC Phase-XIV (Matric) 21 Sep 2026, Shift-III

(a) $\frac{1}{4}$ (b) $\frac{5}{24}$ (c) $\frac{1}{3}$ (d) $\frac{7}{24}$

32 If 5 workers can complete a work in 18 days, then how many workers will be required to complete the same work in 10 days?

SSC Phase-XIV (Matric) 22 Sep 2026, Shift-III

(a) 9 workers (b) 5 workers
(c) 6 workers (d) 7 workers

33 6 men and 8 women can complete a work in 10 days. 26 men and 48 women can complete the same work in 2 days. How much time will 15 men and 20 women take to complete the same work?

SSC Phase-XIV (Matric) 23 Sep 2026, Shift-III

(a) 2 days (b) 4 days (c) 6 days (d) 8 days

34 20 men working 8 hours per day can complete a work in 15 days. In how many days will 16 men working 10 hours per day complete the same work?

SSC Phase-XIV (Matric) 23 Sep 2026, Shift-III

(a) 12 days (b) 15 days (c) 16 days (d) 18 days

35 If A alone can do a work in 12 days and B alone can do the same work in 18 days, then in how many days can both of them together complete it?

SSC Phase-XIV (Matric) 23 Sep 2026, Shift-III

(a) 6 days (b) 7.2 days
(c) 7.5 days (d) 8 days

36 A can complete a project in 10 days. How many days will A take to complete 60% of the project?

SSC Phase-XIV (Matric) 24 Sep 2026, Shift-III

(a) 4 days (b) 5 days (c) 6 days (d) 7 days

37 B can complete a work in 15 days. After working alone for 3 days, what part of the work is left?

SSC Phase-XIV (Matric) 25 Sep 2026, Shift-III

(a) $\frac{3}{5}$ (b) $\frac{4}{5}$ (c) $\frac{1}{5}$ (d) $\frac{2}{5}$

38 If 8 workers can complete a work in 12 days, then how much time (in days) will 6 workers take?

SSC Phase-XIV (Matric) 25 Sep 2026, Shift-III

(a) 12 days (b) 14 days (c) 15 days (d) 16 days

Answer Key *SSC official key*

Time & Work (Q. 01–38)

01	(d)	02	(d)	03	(c)	04	(c)	05	(a)	06	(c)	07	(a)	08	(a)	09	(b)	10	(b)
11	(c)	12	(b)	13	(c)	14	(c)	15	(c)	16	(c)	17	(d)	18	(a)	19	(a)	20	(d)
21	(c)	22	(b)	23	(c)	24	(b)	25	(b)	26	(b)	27	(c)	28	(b)	29	(b)	30	(b)
31	(b)	32	(a)	33	(b)	34	(b)	35	(b)	36	(c)	37	(b)	38	(d)				

Detailed Explanations रटना बंद, समझना शुरू

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Time & Work

01 ANSWER (d) 15 days

SSC Phase-XIV (12th) 16 Sep 2026, Shift-II

Concept: LCM Method Total work = LCM of the days, and efficiency = total work ÷ days.

Total work = LCM(35, 42) = 210 units. A does 6 units a day and B does 5 units a day.

B worked alone for the last 9 days: $5\times9=45$ units. The remaining 165 units were done by A + B together.

Together they do 11 units/day, so $\frac{165}{11}=15$. Both worked together for **15 days**.

02 ANSWER (d) 75 days

SSC Phase-XIV (12th) 16 Sep 2026, Shift-II

Rule: $x^2 = ab$ If $\frac{1}{x+a}+\frac{1}{x+b}=\frac{1}{x}$, then $x^2=ab$

Let R = x days. Then P = $x+45$, and Q is 25 less than P, so Q = $x+20$.

P and Q together take as long as R: $\frac{1}{x+45}+\frac{1}{x+20}=\frac{1}{x} \Rightarrow x^2=45\times20=900$, $x=30$

P = 30 + 45 = **75 days**.

Examiner's Trap 30 days (option C) is R's time. The question asks for P, so don't forget to add 45.

03 ANSWER (c) 16.2 days

SSC Phase-XIV (12th) 18 Sep 2026, Shift-II

Concept: % to Fraction $44.44\% = \frac{4}{9}$. Remember this one.

Raj does $\frac{4}{9}$ of the work in 36 days, so he does the whole work in 81 days.

In 24 days Raj did $\frac{24}{81} = \frac{8}{27}$. Karan did the remaining $\frac{19}{27}$ in 38 days, so Karan would do the whole work in 54 days.

Total work = LCM(81, 54) = 162 units. Raj does 2, Karan 3, and together 5 units/day.

Half the work is 81 units, so $\frac{81}{5} = 16.2$ days. The answer is **16.2 days**.

04 ANSWER (c) 5 days

SSC Phase-XIV (12th) 18 Sep 2026, Shift-II

Concept: Efficiency Units Man : Woman : Child = 4 : 2 : 1

Total work = $18 \times 4 \times 10 = 720$ units

36 women and 72 children will do
$36 \times 2 + 72 \times 1 = 144$ units a day

Days = $\frac{720}{144} = 5$, so the work gets done in **5 days**.

05 ANSWER (a) 37.33 days

SSC Phase-XIV (12th) 19 Sep 2026, Shift-II

Formula: Total Work Total work = Efficiency × Time

Ravi is three times as efficient, so take Krishna's efficiency as 1 unit/day. Ravi's efficiency becomes 3 units/day, and together they do 4 units/day.

Together they finish the work in 28 days, so total work = $4 \times 28 = 112$ units.

Now Ravi alone = $\frac{112}{3} = 37.33$ days.
So the answer is **37.33 days**.

Short Trick Ravi's share of the total efficiency is $\frac{3}{4}$.
So Ravi will take $28 \times \frac{4}{3} = 37.33$ days.

06 ANSWER (c) 17 days

SSC Phase-XIV (12th) 19 Sep 2026, Shift-II

Formula: Total Work Total work = (Efficiency of P + Q) × Time

Take P's efficiency as 9 and Q's as 5 units/day.
Together they do 14 units/day.
Total work = $14 \times 7.5 = 105$ units.

P did $\frac{3}{7}$ of the work, that is $\frac{3}{7} \times 105 = 45$ units. This took him $\frac{45}{9} = 5$ days.

Remaining work = $105 - 45 = 60$ units, which Q did in $\frac{60}{5} = 12$ days.
Total time = $5 + 12 = 17$ days, so the answer is **17 days**.

07 ANSWER (a) 78

SSC Phase-XIV (12th) 21 Sep 2026, Shift-II

Formula: M1D1 = M2D2 $M_1D_1 = M_2D_2$ (when the work is the same)

Put the values straight in: $26 \times 45 = M_2 \times 15$

$M_2 = \frac{26 \times 45}{15} = 26 \times 3 = 78$
The days became one-third, so we need three times the men. That gives **78**.

08 ANSWER (a) 77 days

SSC Phase-XIV (12th) 21 Sep 2026, Shift-II

Rule: Efficiency ∝ 1/Time If the efficiency ratio is a : b, the time ratio will be b : a.

Efficiency of A : B is 7 : 5, so time of A : B = 5 : 7.

5 parts = 55 days, so 1 part = 11 days. B's time = $7 \times 11 = 77$ days.
The correct option is **77 days**.

Examiner's Trap If you apply the ratio directly to time, you get $55 \times \frac{5}{7} \approx 39$ days. Think about it. B is less efficient, so he must take more time. That is why the ratio has to be reversed.

09 ANSWER (b) 15.4 days

SSC Phase-XIV (12th) 21 Sep 2026, Shift-II

Concept: Same Total Work Keep the total work equal in both situations.

Let Ravi's efficiency be R and Krishna's be K.
First case: Work = $7(R+K)$
Second case: Work = $4\left(3R + \frac{K}{4}\right) = 12R + K$

Equate the two: $7R + 7K = 12R + K \Rightarrow 6K = 5R$, which means R : K = 6 : 5.

Taking R = 6, K = 5, total work = $7 \times 11 = 77$ units.
Krishna alone = $\frac{77}{5} = 15.4$ days. The answer is **15.4**

days.

10 **ANSWER (b)** 10 days

SSC Phase-XIV (12th) 21 Sep 2026, Shift-II

Method: LCM Method Total work = LCM(12, 18, 24) = 72 units

Find the efficiencies: A = 6, B = 4, C = 3 units/day. Let the whole work be finished in T days.

Note this carefully. A worked only 3 days, B worked $(T-4)$ days and C worked for all T days:
$6\times3+4(T-4)+3T=72$

$18+4T-16+3T=72\Rightarrow7T=70\Rightarrow T=10$
So the work is completed in **10 days**.

Short Trick Just write down how many days each person worked. Then the total of (efficiency × days) = total work. You don't need to break it into phases at all.

11 **ANSWER (c)** 224 days

SSC Phase-XIV (12th) 23 Sep 2026, Shift-II

Concept: 83.33% = 5/6 $83.33\%=\frac{5}{6}$. Remember this value.

B does $\frac{5}{6}$ of the work in 25 days, so the full work in $25\times\frac{6}{5}=30$ days.

A's 1 day work = $\frac{1}{28}-\frac{1}{30}=\frac{30-28}{840}=\frac{1}{420}$
This means A alone will take 420 days.

Now for $\frac{8}{15}$ of the work, $420\times\frac{8}{15}=224$ days.
Option (c) **224 days** is correct.

12 **ANSWER (b)** 12 days

SSC Phase-XIV (12th) 23 Sep 2026, Shift-II

Concept: Same Total Work Rohit's days × r + Suresh's days × s = Total work

Let Rohit's efficiency be r and Suresh's be s. The work is the same in both cases:
$6r+24s=9r+12s\Rightarrow12s=3r\Rightarrow r=4s$

Taking s = 1, r = 4, total work = $6\times4+24\times1=48$ units.

Rohit alone = $\frac{48}{4}=12$ days.
So the answer is **12 days**.

Short Trick Rohit's 3 extra days = Suresh's 12 days, so 1 day of Rohit = 4 days of Suresh. Suresh's 24 days = Rohit's 6 days. So Rohit needs $6+6=12$ days in all.

13 **ANSWER (c)** 21 hours

SSC Phase-XIV (12th) 24 Sep 2026, Shift-II

Rule: Efficiency ∝ 1/Time For the same work, efficiency is in the inverse ratio of time.

Time of Ravi and Suresh is 2 : 3, so efficiency is 3 : 2.
Time of Ravi and Mahesh is 4 : 6, so efficiency is also 3 : 2.

Ravi is 3 in both, so Ravi : Suresh : Mahesh = 3 : 2 : 2, a total of 7 units/hour.
Tank = $7\times6=42$ units.

Mahesh alone = $\frac{42}{2}=21$ hours. The answer is **21 hours**.

14 **ANSWER (c)** Rs345

SSC Phase-XIV (12th) 24 Sep 2026, Shift-II

Concept: Wages ∝ Work The money is shared in the same ratio as the work each person did.

First find C: C's share = $1-\frac{19}{23}=\frac{4}{23}$
Then B = $\frac{8}{23}-\frac{4}{23}=\frac{4}{23}$

A's share = $\frac{19}{23}-\frac{4}{23}=\frac{15}{23}$

A's wages = $529\times\frac{15}{23}=23\times15=345$ rupees, that is **Rs345**.

15 **ANSWER (c)** 62.67 weeks

SSC Phase-XIV (12th) 26 Sep 2026, Shift-I

Formula: Worker-Weeks Work = Workers × Weeks

Work in the first 15 weeks = $500\times15=7500$ worker-weeks, which is $\frac{2}{5}$ of the job.
So the whole job = $7500\times\frac{5}{2}=18750$ worker-weeks.

In the storm, half of the built part fell, so now only $\frac{1}{5}$ of the job = 3750 is left standing.
Work still to be done = $18750-3750=15000$ worker-weeks.

360 workers will do this in $\frac{15000}{360}=41.67$ weeks.

Total from the start = $15+6+41.67=62.67$ weeks.
That makes option (c) **62.67 weeks** correct.

Examiner's Trap The 6 weeks of the storm are also counted. If you write only 15 + 41.67 = 56.67, you will go wrong.

16 **ANSWER (c)** 2550

SSC Phase-XIV (12th) 26 Sep 2026, Shift-I

Concept: Rate = Work/Time Bricks per hour = Total bricks ÷ Time

Let the wall have N bricks. Sum of the three rates = $\frac{N}{12}+\frac{N}{15}+\frac{N}{20}=\frac{5N+4N+3N}{60}=\frac{N}{5}$

Working together, the actual rate is $\frac{N}{5}-340$, and the wall is built in 15 hours:

$15\left(\frac{N}{5}-340\right)=N \Rightarrow 3N-5100=N$

$2N=5100 \Rightarrow N=2550$

So the wall has **2550** bricks.

Short Trick The actual combined rate is simply $\frac{N}{15}$.

So $\frac{N}{5}-\frac{N}{15}=340 \Rightarrow \frac{2N}{15}=340 \Rightarrow N=2550$.

17 **ANSWER (d)** 44 days

SSC Phase-XIV (12th) 26 Sep 2026, Shift-I

Concept: Efficiency Ratio Total work = Total efficiency × Time

Take C = 2 units/day. B is 50% more, so 3. A is double of B, so 6.

Total efficiency = 6 + 3 + 2 = 11 units/day.

Total work = 11 × 12 = 132 units, and B alone = $\frac{132}{3}=44$ days.

The correct option is **44 days**.

18 **ANSWER (a)** 32 days

SSC Phase-XIV (Matric) 16 Sep 2026, Shift-III

Formula: M1D1 = M2D2 The food is the same, so persons × days stays fixed.

Total food = 24 × 16 = 384 person-days.

For 12 persons = $\frac{384}{12}=32$ days. Half the people, double the days. The answer is **32 days**.

19 **ANSWER (a)** $\frac{1}{18}$

SSC Phase-XIV (Matric) 16 Sep 2026, Shift-III

Concept: 1 Day's Work 1 day's work = 1 ÷ Total days

A does $\frac{1}{18}$ of the work in a day and B does $\frac{1}{9}=\frac{2}{18}$.

Difference = $\frac{2}{18}-\frac{1}{18}=\frac{1}{18}$

So B does $\frac{1}{18}$ more work every day.

20 **ANSWER (d)** 14 weeks

SSC Phase-XIV (Matric) 17 Sep 2026, Shift-III

Formula: M1D1 = M2D2 $M_1D_1=M_2D_2$

Total work of the house = $7\times20=140$ labourer-weeks. 10 labourers will do it in $\frac{140}{10}=14$ weeks.

The answer is **14 weeks**.

21 **ANSWER (c)** $\frac{3}{4}$

SSC Phase-XIV (Matric) 17 Sep 2026, Shift-III

A and B together finish $\frac{1}{4}$ of the work in one day.

So the work left = $1-\frac{1}{4}=\frac{3}{4}$, that is $\frac{3}{4}$.

Examiner's Trap The question asks for the part 'left'. Don't mark the part already done ($\frac{1}{4}$).

22 **ANSWER (b)** 20 days

SSC Phase-XIV (Matric) 17 Sep 2026, Shift-III

Formula: Labourer-Days Work = Labourers × Days

Total work = $15\times24=360$ labourer-days. Work done in the first 8 days = $15\times8=120$.

240 labourer-days are left, and now there are 20 labourers. So $\frac{240}{20}=12$ more days.

Total = 8 + 12 = 20 days.

So the answer is **20 days**.

Examiner's Trap The remaining time alone (12 days) is not the answer. You must add the first 8 days and give the full time.

23 **ANSWER (c)** 24 days

SSC Phase-XIV (Matric) 18 Sep 2026, Shift-III

Formula: M1D1 = M2D2 The food is fixed, so persons × days is fixed.

$22\times36=33\times D_2$

$D_2=\frac{22\times36}{33}=\frac{2\times36}{3}=24$

The food will last **24 days**.

24 **ANSWER (b)** 18 days

SSC Phase-XIV (Matric) 18 Sep 2026, Shift-III

Formula: D1H1 = D2H2 The workers are the same, so days × hours stays fixed.

Total working hours = $27 \times 6 = 162$.

Working 9 hours a day, it takes $\frac{162}{9} = 18$ days. The answer is **18 days**.

25 **ANSWER (b)** 1/3

SSC Phase-XIV (Matric) 18 Sep 2026, Shift-III

A does $\frac{1}{6}$ of the work every day, so in 2 days $2 \times \frac{1}{6} = \frac{1}{3}$
This means **1/3** of the chart will be done.

26 **ANSWER (b)** 2 days

SSC Phase-XIV (Matric) 19 Sep 2026, Shift-III

Formula: Labourer-Days Work = Labourers × Days

Total work = $12 \times 9 = 108$. Done in 6 days = $12 \times 6 = 72$, so 36 is left.

Now there are 18 labourers, so $\frac{36}{18} = 2$ days.
The correct option is **2 days**.

Short Trick The remaining work equals 3 days of 12 labourers. The labourers became 1.5 times, so time $= \frac{3}{1.5} = 2$ days.

27 **ANSWER (c)** 15 days

SSC Phase-XIV (Matric) 19 Sep 2026, Shift-III

$\frac{3}{5}$ of the work took 9 days, so $\frac{1}{5}$ of the work takes 3 days.

The whole work takes $5 \times 3 = 15$ days, so the answer is **15 days**.

28 **ANSWER (b)** 6

SSC Phase-XIV (Matric) 19 Sep 2026, Shift-III

Formula: M1D1/W1 = M2D2/W2 $\frac{M_1D_1}{W_1} = \frac{M_2D_2}{W_2}$

Here $W_1 = \frac{2}{3}$ and $W_2 = 1$:
$\frac{5 \times 12}{2/3} = \frac{M_2 \times 15}{1}$

$90 = 15M_2 \Rightarrow M_2 = 6$
So **6** labourers are needed.

29 **ANSWER (b)** 9 days

SSC Phase-XIV (Matric) 21 Sep 2026, Shift-III

The machines went from 15 to 45, that is 3 times. So the time will become one-third.

Time = $\frac{15 \times 27}{45} = \frac{27}{3} = 9$ days. The answer is **9 days**.

30 **ANSWER (b)** 12 days

SSC Phase-XIV (Matric) 21 Sep 2026, Shift-III

Formula: M1D1 = M2D2 $M_1D_1 = M_2D_2$

Total work = $27 \times 20 = 540$ worker-days.

With 45 workers, it takes $\frac{540}{45} = 12$ days.
So **12 days** is correct.

31 **ANSWER (b)** $\frac{5}{24}$

SSC Phase-XIV (Matric) 21 Sep 2026, Shift-III

Think with LCM 24. A's 1 day work = $\frac{1}{8} = \frac{3}{24}$, B's = $\frac{1}{12} = \frac{2}{24}$.

Together = $\frac{3}{24} + \frac{2}{24} = \frac{5}{24}$
So in 1 day they paint $\frac{5}{24}$ of the wall.

32 **ANSWER (a)** 9 workers

SSC Phase-XIV (Matric) 22 Sep 2026, Shift-III

Formula: M1D1 = M2D2 $M_1D_1 = M_2D_2$

$5 \times 18 = M_2 \times 10$

$M_2 = \frac{90}{10} = 9$
So **9 workers** will be needed.

33 **ANSWER (b)** 4 days

SSC Phase-XIV (Matric) 23 Sep 2026, Shift-III

Concept: Same Total Work (Men × m + Women × w) × Days = Total work

Let the efficiency of 1 man be m and of 1 woman be w. The work is equal in both cases:
$10(6m + 8w) = 2(26m + 48w) \Rightarrow 60m + 80w = 52m + 96w$

$8m = 16w \Rightarrow m = 2w$. Now take w = 1, m = 2, so total work = $10(12 + 8) = 200$ units.

15 men + 20 women will do $30 + 20 = 50$ units a day.
Time = $\frac{200}{50} = 4$ days.

The correct option is **4 days**.

34 **ANSWER (b)** 15 days

SSC Phase-XIV (Matric) 23 Sep 2026, Shift-III

Formula: M1D1H1 = M2D2H2 $M_1D_1H_1 = M_2D_2H_2$

$20 \times 15 \times 8 = 16 \times D_2 \times 10$

$2400 = 160D_2 \Rightarrow D_2 = 15$

So the answer is **15 days**.

Short Trick Look at the daily man-hours: $20 \times 8 = 160$ and $16 \times 10 = 160$. Both are equal, so the days are also the same, 15.

35 **ANSWER (b)** 7.2 days

SSC Phase-XIV (Matric) 23 Sep 2026, Shift-III

Formula: Time Together $T = \frac{ab}{a+b}$

$T = \frac{12 \times 18}{12+18} = \frac{216}{30} = 7.2$

Together they will finish the work in **7.2 days**.

36 **ANSWER (c)** 6 days

SSC Phase-XIV (Matric) 24 Sep 2026, Shift-III

The full work takes 10 days. For 60% of the work, $10 \times \frac{60}{100} = 6$ days.

A direct answer, **6 days**.

37 **ANSWER (b)** $\frac{4}{5}$

SSC Phase-XIV (Matric) 25 Sep 2026, Shift-III

B does $\frac{1}{15}$ of the work daily, so in 3 days $\frac{3}{15} = \frac{1}{5}$.

Work left = $1 - \frac{1}{5} = \frac{4}{5}$, which is option (b) $\frac{4}{5}$.

Examiner's Trap $\frac{1}{5}$ is the work done, not the work left. Option (c) is there to catch exactly this mistake.

38 **ANSWER (d)** 16 days

SSC Phase-XIV (Matric) 25 Sep 2026, Shift-III

Formula: M1D1 = M2D2 $M_1D_1 = M_2D_2$

Total work = $8 \times 12 = 96$ worker-days.

Fewer workers means more days: $\frac{96}{6} = 16$ days. The answer is **16 days**.

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14 CHAPTER

Time, Speed & Distance

Questions *25 questions · 20 shifts*

Time, Speed & Distance

Directions (Q. 01–25): *Choose the correct answer from the four given options.*

01 A vehicle travels from city A to city B at a constant speed of 30 km/h and returns from city B to city A at a constant speed of 90 km/h. Find the average speed for the whole journey.

SSC Phase-XIV (Graduation) 22 Sep 2026, Shift-I

(a) 35 km/h (b) 25 km/h
(c) 45 km/h (d) 15 km/h

02 Two stations X and Y are 900 km apart. Train P starts from station X towards Y and at the same time train Q starts from station Y towards X. Train Q is 50% faster than train P and both trains run at constant speeds. Find the distance from station Y of the point where the two trains meet.

SSC Phase-XIV (12th) 16 Sep 2026, Shift-II

(a) 360 km (b) 540 km (c) 180 km (d) 420 km

03 A person travels 640 km in 16 hours, partly by train and partly by car. If the train covers 3 times the distance covered by the car and the speed of the train is 60 km/h, find the speed of the car.

SSC Phase-XIV (12th) 17 Sep 2026, Shift-II

(a) 20 km/h (b) 30 km/h
(c) 35 km/h (d) 25 km/h

04 A car travels from city P to city Q at a constant speed. If its speed were increased by 6 km/h, the journey would take 1 hour less. If the speed were increased by a further 4 km/h (i.e. 10 km/h more than the original speed), the journey would take an additional 30 minutes less. What is the distance between the two cities?

SSC Phase-XIV (12th) 18 Sep 2026, Shift-II

(a) 360 km (b) 180 km (c) 40 km (d) 200 km

05 Train A takes $1\frac{1}{2}$ hours more than train B to cover a distance of 240 km. If the speed of train A is doubled, it takes 30 minutes less than the time taken by train B for the same distance. What is the speed of train B?

SSC Phase-XIV (12th) 19 Sep 2026, Shift-II

(a) 100 km/h (b) 84 km/h
(c) 96 km/h (d) 72 km/h

06 Atul covers a distance of 436 km by car in 8 hours. Find the speed of the car.

SSC Phase-XIV (12th) 21 Sep 2026, Shift-II

(a) 54.75 km/h (b) 54.50 km/h
(c) 65.50 km/h (d) 64.75 km/h

07 Two cars start at the same time from A and B, which are 120 km apart. If they move towards each other, they meet in 1 hour. If they move in the same direction, the faster car overtakes the slower car in 6 hours. What is the speed of the faster car?

SSC Phase-XIV (12th) 22 Sep 2026, Shift-II

(a) 50 km/h (b) 60 km/h
(c) 70 km/h (d) 80 km/h

08 In a 1000 m race, A beats B by 35 seconds and beats C by 200 m. If B and C run a 1000 m race, B beats C by 35 seconds. Find the time taken by A to complete the race.

SSC Phase-XIV (12th) 23 Sep 2026, Shift-II

(a) 240 seconds (b) 250 seconds
(c) 270 seconds (d) 280 seconds

09 A cyclist covers a distance of 36 km in 9 hours. What is his average speed?

SSC Phase-XIV (12th) 24 Sep 2026, Shift-II

(a) 4 km/h (b) 6 km/h (c) 5 km/h (d) 7 km/h

10 A person goes to his office at three-fourths of his usual speed and reaches 20 minutes later than usual. Determine the time he usually takes to reach his office.

SSC Phase-XIV (12th) 25 Sep 2026, Shift-II

(a) 80 minutes (b) 30 minutes
(c) 60 minutes (d) 45 minutes

11 A person starts his journey 36 minutes later than his regular departure time. To make up for the delay, he travels at 180% of his usual speed and reaches his destination 16 minutes before his usual arrival time. Find the usual time taken for the journey.

SSC Phase-XIV (12th) 26 Sep 2026, Shift-I

(a) 95 minutes (b) 117 minutes
(c) 104 minutes (d) 119 minutes

12 A train going from P to Q meets with an accident after travelling 90 km. Due to the accident, the train reduces its speed to $\frac{2}{3}$ of its usual speed and reaches its destination 30 minutes late. Had the same accident happened 60 km further on, the train would have reached the same destination only 10 minutes late. What is the distance from P to Q?

SSC Phase-XIV (12th) 26 Sep 2026, Shift-I

(a) 170 km (b) 180 km (c) 210 km (d) 190 km

13 A train covers a certain distance in 16 hours at a speed of 81 km/h. How much time will it take to cover the same distance at a speed of 108 km/h?

SSC Phase-XIV (Matric) 16 Sep 2026, Shift-III

(a) 14 hours (b) 11 hours
(c) 13 hours (d) 12 hours

14 A cyclist travels at a speed of 12 km/h for 2.5 hours. What distance does he cover?

SSC Phase-XIV (Matric) 16 Sep 2026, Shift-III

(a) 24 km (b) 28 km (c) 30 km (d) 32 km

15 A bus travels 240 km at a speed of 60 km/h. How much time does it take?

SSC Phase-XIV (Matric) 17 Sep 2026, Shift-III

(a) 3 hours (b) 4 hours (c) 5 hours (d) 6 hours

16 A train covers a distance of 150 km in 2 hours 30 minutes. What is its speed?

SSC Phase-XIV (Matric) 18 Sep 2026, Shift-III

(a) 50 km/h (b) 55 km/h
(c) 60 km/h (d) 65 km/h

17 Amit goes from A to B at a speed of 60 km/h and returns from B to A at a different speed. His overall average speed is 48 km/h. What was his speed from B to A?

SSC Phase-XIV (Matric) 19 Sep 2026, Shift-III

(a) 42 km/h (b) 38 km/h
(c) 32 km/h (d) 40 km/h

18 A person covers half of a journey at a speed of 40 km/h and the remaining half at a speed of 60 km/h. If the total distance is 200 km, what is the total time taken?

SSC Phase-XIV (Matric) 19 Sep 2026, Shift-III

(a) 4 hours (b) 4 hours 10 minutes
(c) 4 hours 20 minutes (d) 4 hours 30 minutes

19 A car covers a distance of 180 km in 3 hours. What is its speed?

SSC Phase-XIV (Matric) 21 Sep 2026, Shift-III

(a) 50 km/h (b) 55 km/h
(c) 60 km/h (d) 65 km/h

20 A train covers a certain distance in 18 hours at a speed of 90 km/h. How much time will it take to cover the same distance at a speed of 120 km/h?

SSC Phase-XIV (Matric) 22 Sep 2026, Shift-III

(a) 14 hours (b) 13.5 hours
(c) 15 hours (d) 12 hours

21 A student walks 3 km to school at a speed of 5 km/h and returns by the same route at a speed of 3 km/h. What is the total time taken for the whole

journey?

SSC Phase-XIV (Matric) 22 Sep 2026, Shift-III

(a) 1 hour 24 minutes (b) 1 hour 30 minutes
(c) 1 hour 36 minutes (d) 1 hour 40 minutes

22 A person covers a certain distance at a certain speed. If he reduces his speed by 20%, he takes 15 minutes more to cover the same distance. Find his original time to cover the distance.

SSC Phase-XIV (Matric) 23 Sep 2026, Shift-III

(a) 1 hour (b) 2 hours (c) 6 hours (d) 8 hours

23 A runner completes one round of a 400 m track in 80 seconds. What is his speed in m/s?

SSC Phase-XIV (Matric) 24 Sep 2026, Shift-III

(a) 4 m/s (b) 5 m/s (c) 6 m/s (d) 8 m/s

24 A runner completes $\frac{5}{6}$ of a marathon in 3.5 hours. If he maintains the same speed, how many minutes will he take to complete the remaining part of the race?

SSC Phase-XIV (Matric) 24 Sep 2026, Shift-III

(a) 40 minutes (b) 42 minutes
(c) 30 minutes (d) 28 minutes

25 Two cities are 210 km apart. A bus covers the first 120 km at a speed of 40 km/h and the remaining distance at a speed of 30 km/h. What is the total time taken?

SSC Phase-XIV (Matric) 25 Sep 2026, Shift-III

(a) 5 hours (b) 5.5 hours
(c) 6 hours (d) 6.5 hours

Answer Key *SSC official key*

Time, Speed & Distance (Q. 01–25)

01	(c)	02	(b)	03	(a)	04	(b)	05	(c)	06	(b)	07	(c)	08	(d)	09	(a)	10	(c)
11	(b)	12	(b)	13	(d)	14	(c)	15	(b)	16	(c)	17	(d)	18	(b)	19	(c)	20	(b)
21	(c)	22	(a)	23	(b)	24	(b)	25	(c)										

Detailed Explanations रटना बंद, समझना शुरू

Time, Speed & Distance

01 **ANSWER (c)** 45 km/h

SSC Phase-XIV (Graduation) 22 Sep 2026, Shift-I

Formula: Average Speed When the distances are equal and the speeds are x and y, average speed $= \frac{2xy}{x+y}$

Here $x = 30$, $y = 90$. Putting the values: $\frac{2 \times 30 \times 90}{30+90} = \frac{5400}{120}$ $= 45$, so the average speed is **45 km/h**.

Examiner's Trap The simple average $\frac{30+90}{2} = 60$ does not work here. The distances are equal, not the times, so you must use $\frac{2xy}{x+y}$.

02 **ANSWER (b)** 540 km

SSC Phase-XIV (12th) 16 Sep 2026, Shift-II

Concept: Same Time When both start at the same time, the distance covered is divided in the ratio of their speeds.

Q is 50% faster than P, which means speed P : Q = 2 : 3.

Divide 900 km in the ratio 2 : 3. Starting from Y, Q covers $900 \times \frac{3}{5} = 540$ km.

The meeting point is exactly as far from Y as Q has travelled, that is **540 km**.

Examiner's Trap 360 km is also sitting in the options, but that is the distance from X. The question asks for the distance from Y, and this is where students get caught.

03 **ANSWER (a)** 20 km/h

SSC Phase-XIV (12th) 17 Sep 2026, Shift-II

Formula: Speed Speed $= \frac{D}{T}$ (D = distance, T = time)

The distances by train and car are in the ratio 3 : 1. Split 640 into 4 parts, so the train covers 480 km and the car 160 km.

Time by train $= \frac{480}{60} = 8$ hours. The remaining $16 - 8 = 8$ hours belong to the car.

Speed of the car $= \frac{160}{8} = 20$, that is **20 km/h**.

04 **ANSWER (b)** 180 km

SSC Phase-XIV (12th) 18 Sep 2026, Shift-II

Concept: Time Difference $\frac{D}{v} - \frac{D}{v+a} = \frac{Da}{v(v+a)}$

Let the distance be D and the speed v. From the first condition, $\frac{6D}{v(v+6)} = 1$. The second time, a total of 1.5 hours is saved, so $\frac{10D}{v(v+10)} = \frac{3}{2}$

Equate D from both: $\frac{v(v+6)}{6} = \frac{3v(v+10)}{20}$. This gives $20(v+6) = 18(v+10)$, then $2v = 60$ and $v = 30$ km/h.

Now $D = \frac{30 \times 36}{6} = 180$ km. Let us check: $6 - 4.5 = 1.5$ hours ✓. So the distance is **180 km**.

Short Trick Check straight from the options. Cover 180 km at 30, 36 and 40 km/h and the times are 6, 5 and 4.5 hours. The differences are 1 and 1.5 hours, and both conditions are met.

05 **ANSWER (c)** 96 km/h

SSC Phase-XIV (12th) 19 Sep 2026, Shift-II

Concept: Doubled Speed Double the speed and the time becomes half.

Let the time of B be T hours. Then the time of A is $T + 1.5$ hours.

With doubled speed, A takes $\frac{T+1.5}{2}$, and this equals $T - 0.5$. So $T + 1.5 = 2T - 1$, which gives $T = 2.5$ hours.

Speed of B $= \frac{240}{2.5} = 96$. The answer is **96 km/h**.

06 **ANSWER (b)** 54.50 km/h

SSC Phase-XIV (12th) 21 Sep 2026, Shift-II

Formula: Speed Speed = Distance ÷ Time

Just divide: $\frac{436}{8} = 54.5$, so the speed is **54.50 km/h**.

07 **ANSWER (c)** 70 km/h

SSC Phase-XIV (12th) 22 Sep 2026, Shift-II

Concept: Relative Speed When moving towards each other, the speeds add up. When moving in the same direction, they are subtracted.

Moving towards each other, they met in 1 hour, so $x + y = \frac{120}{1} = 120$. In the same direction it took 6 hours, so $x - y = \frac{120}{6} = 20$

Add the two and halve: $x = \frac{120+20}{2} = 70$. The faster car runs at **70 km/h**.

08 **ANSWER (d)** 280 seconds

SSC Phase-XIV (12th) 23 Sep 2026, Shift-II

Concept: Race If X beats Y by t seconds, Y takes t seconds more to finish the full race.

Let A's time be t seconds. Then B takes $t + 35$, and C takes $t + 35 + 35 = t + 70$ seconds.

Now look at the other piece of information. In A's t seconds, C runs only 800 m, so for 1000 m he needs $\frac{1000}{800}t = 1.25t$ seconds.

Equate the two: $1.25t = t + 70$, that is $0.25t = 70$ and $t = 280$. A's time is **280 seconds**.

09 **ANSWER (a)** 4 km/h

SSC Phase-XIV (12th) 24 Sep 2026, Shift-II

Formula: Average Speed Average speed = Total distance ÷ Total time

$\frac{36}{9} = 4$, that is **4 km/h**.

10 **ANSWER (c)** 60 minutes

SSC Phase-XIV (12th) 25 Sep 2026, Shift-II

Concept: Speed ∝ 1/Time When the distance is fixed, speed and time are inversely proportional.

Speed became $\frac{3}{4}$, so time became $\frac{4}{3}$ times. In other words, he took $\frac{1}{3}$ of the usual time extra.

This $\frac{1}{3}$ part is 20 minutes, so the usual time = 60 minutes. The answer is **60 minutes**.

Short Trick The speed ratio is 4 : 3, so the time ratio is 3 : 4. 1 unit = 20 minutes, and the usual time of 3 units = 60 minutes.

11 **ANSWER (b)** 117 minutes

SSC Phase-XIV (12th) 26 Sep 2026, Shift-I

Concept: Speed ∝ 1/Time Speed 180% means $\frac{9}{5}$ times, so time becomes $\frac{5}{9}$ times.

He left 36 minutes late and still arrived 16 minutes early. That means he saved a total of 36 + 16 = 52 minutes on the way.

Let the usual time be T. The new time is $\frac{5T}{9}$, so the saving is $T-\frac{5T}{9}=\frac{4T}{9}=52$

$T=\frac{52\times 9}{4}=117$, that is **117 minutes**.

Examiner's Trap A common mistake is to take the saving as only 36 or only 16 minutes. Add the two. The real saving is 52 minutes.

12 ANSWER (b) 180 km

SSC Phase-XIV (12th) 26 Sep 2026, Shift-I

Concept: Difference in Delay The difference in delay comes only from the stretch covered at the slower speed.

The two situations differ by just 60 km. The second time these 60 km were run at normal speed, the first time at $\frac{2}{3}$ speed. That alone made a difference of 30 − 10 = 20 minutes in the delay.

At $\frac{2}{3}$ speed the time becomes $\frac{3}{2}$ times, so the extra time is half the normal time. So the normal time for 60 km is 40 minutes, and the speed $=90$ km/h.

Now take the first situation. On the remaining distance $(d-90)$, delay $=\frac{1}{2}\times\frac{d-90}{90}=\frac{1}{2}$ hour. This gives $d-90=90$, that is $d=180$.

So the distance from P to Q is **180 km**.

13 ANSWER (d) 12 hours

SSC Phase-XIV (Matric) 16 Sep 2026, Shift-III

Concept: S × T = Constant $S_1T_1=S_2T_2$

$T_2=\frac{81\times 16}{108}=\frac{3}{4}\times 16=12$, so it will take **12 hours**.

14 ANSWER (c) 30 km

SSC Phase-XIV (Matric) 16 Sep 2026, Shift-III

Formula: Distance Distance = Speed × Time

$12\times 2.5=30$, so the cyclist covers **30 km**.

15 ANSWER (b) 4 hours

SSC Phase-XIV (Matric) 17 Sep 2026, Shift-III

Formula: Time Time = Distance ÷ Speed

Time $=\frac{240}{60}=4$ hours. The correct option is **4 hours**.

16 ANSWER (c) 60 km/h

SSC Phase-XIV (Matric) 18 Sep 2026, Shift-III

Formula: Speed Speed = Distance ÷ Time (take time in hours)

First convert the time: 2 hours 30 minutes = 2.5 hours.

Speed $=\frac{150}{2.5}=60$, so the answer comes to **60 km/h**.

Examiner's Trap Writing 2 hours 30 minutes as 2.3 hours is a mistake. Remember, 30 minutes = 0.5 hour.

17 ANSWER (d) 40 km/h

SSC Phase-XIV (Matric) 19 Sep 2026, Shift-III

Formula: Average Speed When the distances are equal, average speed $=\frac{2xy}{x+y}$

Take the return speed as v: $\frac{2\times 60\times v}{60+v}=48$, that is $120v=2880+48v$

$72v=2880$, so $v=40$. His speed from B to A is **40 km/h**.

Short Trick Plug in the option and see: $\frac{2\times 60\times 40}{100}=48$ ✓

18 ANSWER (b) 4 hours 10 minutes

SSC Phase-XIV (Matric) 19 Sep 2026, Shift-III

Formula: Time Time = Distance ÷ Speed

Each half is 100 km. First half: $\frac{100}{40}=2.5$ hours, that is 2 hours 30 minutes.

Second half: $\frac{100}{60}=1\frac{2}{3}$ hours, that is 1 hour 40 minutes.

Add them up: 2 hours 30 minutes + 1 hour 40 minutes = **4 hours 10 minutes**.

19 ANSWER (c) 60 km/h

SSC Phase-XIV (Matric) 21 Sep 2026, Shift-III

Formula: Speed Speed = Distance ÷ Time

$\frac{180}{3} = 60$, so option (c) **60 km/h** is correct.

20 **ANSWER (b)** 13.5 hours

SSC Phase-XIV (Matric) 22 Sep 2026, Shift-III

Concept: S × T = Constant $S_1T_1 = S_2T_2$

First find the distance: 90 × 18 = 1620 km.

Time at the new speed $= \frac{1620}{120} = 13.5$, that is **13.5 hours**.

21 **ANSWER (c)** 1 hour 36 minutes

SSC Phase-XIV (Matric) 22 Sep 2026, Shift-III

Formula: Time Time = Distance ÷ Speed

Going: $\frac{3}{5}$ hour = 36 minutes. Returning: $\frac{3}{3} = 1$ hour = 60 minutes.

That is 96 minutes in all, or **1 hour 36 minutes**.

22 **ANSWER (a)** 1 hour

SSC Phase-XIV (Matric) 23 Sep 2026, Shift-III

Concept: Speed ∝ 1/Time If the speed ratio is a : b, the time ratio will be b : a.

Speed fell by 20%, so speed is 5 : 4 and time is 4 : 5.

1 unit = 15 minutes, so the original time of 4 units = 60 minutes, that is **1 hour**.

Examiner's Trap Don't think that a 20% fall in speed means a 20% rise in time. Time goes up by 25%.

23 **ANSWER (b)** 5 m/s

SSC Phase-XIV (Matric) 24 Sep 2026, Shift-III

Formula: Speed Speed = Distance ÷ Time

$\frac{400}{80} = 5$, so the runner's speed is **5 m/s**.

24 **ANSWER (b)** 42 minutes

SSC Phase-XIV (Matric) 24 Sep 2026, Shift-III

Concept: Same Speed When the speed stays the same, time is proportional to distance.

Part left $= 1 - \frac{5}{6} = \frac{1}{6}$. This is $\frac{1}{5}$ of the part already covered.

So the time will also be $\frac{1}{5}$: $\frac{3.5}{5} = 0.7$ hour $= 0.7 \times 60 = 42$ minutes. The answer is **42 minutes**.

25 **ANSWER (c)** 6 hours

SSC Phase-XIV (Matric) 25 Sep 2026, Shift-III

Formula: Time Time = Distance ÷ Speed

The first 120 km take $\frac{120}{40} = 3$ hours. The remaining $210 - 120 = 90$ km take $\frac{90}{30} = 3$ hours.

Total 3 + 3 = **6 hours**.

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15

CHAPTER

Boat & Stream

Questions *2 questions · 2 shifts*

Boat & Stream

Directions (Q. 01–02): *Choose the correct answer from the four given options.*

01 Two boats go downstream from point X to point Y. The faster boat covers the distance from X to Y 1.5 times as fast as the slower boat. It is known that every hour the slower boat falls 12 km behind the faster boat. However, if they go upstream, the faster boat covers the distance from Y to X in half the time taken by the slower boat. Find the speed of the faster boat in still water.

SSC Phase-XIV (12th) 24 Sep 2026, Shift-II

(a) 24 km/h (b) 30 km/h
(c) 28 km/h (d) 42 km/h

02 A boat covers a distance of 36 km downstream in 3 hours and the same distance upstream in 4.5 hours. What is the speed of the boat in still water?

SSC Phase-XIV (Matric) 17 Sep 2026, Shift-III

(a) 8 km/h (b) 9 km/h
(c) 10 km/h (d) 12 km/h

Answer Key *SSC official key*

Boat & Stream (Q. 01–02)			
01	(b)	02	(c)

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Boat & Stream

01 ANSWER (b) 30 km/h

SSC Phase-XIV (12th) 24 Sep 2026, Shift-II

Concept: Boat and Stream Downstream speed = b + w, Upstream speed = b − w

Downstream: faster = 1.5 × slower, with a gap of 12 km every hour. So the slower boat does 24 and the faster 36 km/h.

Let the speed of the stream be w. In still water, faster boat $= 36 - w$, slower $= 24 - w$.

Against the stream the faster boat takes half the time, which means its upstream speed is double: $36 - 2w = 2(24 - 2w)$. This gives $2w = 12$, so $w = 6$

Faster boat in still water = 36 − 6 = 30, that is **30 km/h**.

Examiner's Trap 36 km/h is the downstream speed, and the stream is already added to it. Don't take it as the speed in still water.

02 ANSWER (c) 10 km/h

SSC Phase-XIV (Matric) 17 Sep 2026, Shift-III

Formula: Still Water Speed Speed of boat $= \frac{D+U}{2}$ (D = downstream speed, U = upstream speed)

Downstream speed $= \frac{36}{3} = 12$ km/h. Upstream speed $= \frac{36}{4.5} = 8$ km/h.

In still water, $\frac{12+8}{2} = 10$, so the correct option is **10 km/h**.

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16 CHAPTER Problems on Trains

Questions *1 question · 1 shift*

Problems on Trains

Directions (Q. 01): *Choose the correct answer from the four given options.*

01 A train running at a speed of 72 km/h crosses a bridge in 30 seconds. If the speed becomes 90 km/h, how much time will it take to cross the same bridge?

SSC Phase-XIV (Matric) 17 Sep 2026, Shift-III

(a) 20 seconds (b) 22 seconds
(c) 24 seconds (d) 25 seconds

Answer Key *SSC official key*

Problems on Trains (Q. 01)		
01	(c)	

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Problems on Trains

01 **ANSWER (c)** 24 seconds

SSC Phase-XIV (Matric) 17 Sep 2026, Shift-III

Concept: Crossing a Bridge Distance covered = length of train + length of bridge. This stays the same both times.

72 km/h $= 72 \times \frac{5}{18} = 20$ m/s. So the total distance $= 20 \times 30 = 600$ m.

90 km/h $= 25$ m/s, so time $= \frac{600}{25} = 24$. The answer is **24 seconds**.

Short Trick The distance is the same, so there is no need to convert units at all: $30 \times \frac{72}{90} = 24$ seconds.

17
CHAPTER

Pipe & Cistern

Questions *1 question · 1 shift*

Pipe & Cistern

Directions (Q. 01): *Choose the correct answer from the four given options.*

01 A tap fills a tank in 15 minutes. What part of the tank does it fill in 5 minutes?

SSC Phase-XIV (Matric) 22 Sep 2026, Shift-III

(a) 1/4 (b) 1/3 (c) 1/5 (d) 1/2

Answer Key *SSC official key*

Pipe & Cistern (Q. 01)		
01	(b)	

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Pipe & Cistern

01 **ANSWER (b)** 1/3

SSC Phase-XIV (Matric) 22 Sep 2026, Shift-III

Concept: 1 Minute's Work If it takes n minutes to fill completely, it fills $\frac{1}{n}$ part in 1 minute.

In 1 minute it fills $\frac{1}{15}$ part, so in 5 minutes $\frac{5}{15} = \frac{1}{3}$

The tap fills **1/3** of the tank in 5 minutes.

18 CHAPTER Algebra

Questions *56 questions · 21 shifts*

Algebra

Directions (Q. 01–56): *Choose the correct answer from the four given options.*

01 For what value of x is the statement $\left(\frac{x}{27}\right)\left(\frac{x}{108}\right)=1$ true?

SSC Phase-XIV (Graduation) 17 Sep 2026, Shift-I

(a) 76 (b) 34 (c) 66 (d) 54

02 If $a+\frac{1}{a}=2$, then find $a^{2021}+\frac{1}{a^{2027}}$.

SSC Phase-XIV (Graduation) 17 Sep 2026, Shift-I

(a) 0 (b) 1 (c) 2 (d) -1

03 If $8x^3-27y^3=(2x-3y)(Mx^2+Ny^2+Oxy)$, then find $M^2+N^2+O^2$.

SSC Phase-XIV (Graduation) 17 Sep 2026, Shift-I

(a) 118 (b) 125 (c) 133 (d) 140

04 Find x : $\sqrt{x+8}=10$

SSC Phase-XIV (Graduation) 18 Sep 2026, Shift-I

(a) 92 (b) None (c) 84 (d) 100

05 If $x+1/x=3$, then what is the value of x^2+1/x^2?

SSC Phase-XIV (Graduation) 18 Sep 2026, Shift-I

(a) 7 (b) 9 (c) 5 (d) 6

06 Which of the following pairs of expressions are like terms?

SSC Phase-XIV (Graduation) 18 Sep 2026, Shift-I

(a) $7x$ and $7y$ (b) $7x$ and $9x$
(c) $7x$ and $7xz$ (d) $7x$ and $7xy$

07 If $a+b=3$ and $ab=2$, then find the value of a^3+b^3.

SSC Phase-XIV (Graduation) 19 Sep 2026, Shift-I

(a) 9 (b) 18 (c) 12 (d) 6

08 If $x+\frac{1}{x}=9$, then find the value of $x^3+\frac{1}{x^3}+x^2+\frac{1}{x^2}$.

SSC Phase-XIV (Graduation) 19 Sep 2026, Shift-I

(a) 702 (b) 729 (c) 779 (d) 781

09 If positive real numbers a, b, c are in Arithmetic Progression (A.P.) and a^2, b^2, c^2 are in Geometric Progression (G.P.), then what is the relation between a, b, c?

SSC Phase-XIV (Graduation) 21 Sep 2026, Shift-I

(a) $a+b+c=0$
(b) $a+c=2b$ and $abc=0$
(c) $b=a+c$
(d) $a^2+c^2=2b^2$

10 Solve: $3x+5=20$.

SSC Phase-XIV (Graduation) 21 Sep 2026, Shift-I

(a) 5 (b) 6 (c) 10 (d) 15

11 Simplify: $7^2+2\times7\times3+3^2$

SSC Phase-XIV (Graduation) 21 Sep 2026, Shift-I

(a) 100 (b) 121 (c) 64 (d) 169

12 How many solutions does the equation $3x-2y=6$ have?

SSC Phase-XIV (Graduation) 21 Sep 2026, Shift-I

(a) None (b) One

(c) Two (d) Infinitely many

13 For what value of x is the statement $\left(\frac{x}{16}\right)\left(\frac{x}{64}\right)=1$ true?

SSC Phase-XIV (Graduation) 22 Sep 2026, Shift-I

(a) 48 (b) 32 (c) 68 (d) 52

14 If $k-\frac{1}{k}=5$, then find the value of $k^3-\frac{1}{k^3}$.

SSC Phase-XIV (Graduation) 22 Sep 2026, Shift-I

(a) 125 (b) 130 (c) 140 (d) 155

15 If $x^4+\frac{1}{x^4}=322$ and $x>1$, then what is the value of the expression $x-\frac{1}{x}$?

SSC Phase-XIV (Graduation) 22 Sep 2026, Shift-I

(a) 4 (b) 8 (c) 12 (d) 16

16 Factorise: $x^2-10x+25$

SSC Phase-XIV (Graduation) 23 Sep 2026, Shift-I

(a) $(x-5)^2$ (b) $(x-10)^2$ (c) $(x-15)^2$ (d) $(x-25)^2$

17 Solve for 'x': $4x-7=5x-3$.

SSC Phase-XIV (Graduation) 23 Sep 2026, Shift-I

(a) 4 (b) -4 (c) 3 (d) -3

18 Which of the following represents $(x+y)^2$?

SSC Phase-XIV (Graduation) 23 Sep 2026, Shift-I

(a) x^2+y^2 (b) $x^2+2xy+y^2$
(c) $x^2-2xy+y^2$ (d) x^2-y^2

19 If $\sqrt{x}+\frac{1}{\sqrt{x}}=\sqrt{7}$, then what is the value of $x+\frac{1}{x}$?

SSC Phase-XIV (Graduation) 23 Sep 2026, Shift-I

(a) 1 (b) 2 (c) 4 (d) 5

20 If $x^2+\frac{1}{x^2}=14$, then find the value of $\left(x+\frac{1}{x}\right)^2$.

SSC Phase-XIV (Graduation) 23 Sep 2026, Shift-I

(a) 10 (b) 12 (c) 14 (d) 16

21 If $x+\frac{1}{x}=2$, then what is the value of $x^7+\frac{1}{x^{117}}$?

SSC Phase-XIV (Graduation) 24 Sep 2026, Shift-I

(a) 2 (b) 1 (c) 3 (d) 4

22 If $p+q+r=0$ and $pq+qr+rp=-35$, then find $p^4+q^4+r^4$.

SSC Phase-XIV (Graduation) 24 Sep 2026, Shift-I

(a) 2400 (b) 2450 (c) 3675 (d) 4900

23 Find the value of $(5x+2)^2-(5x-2)^2$.

SSC Phase-XIV (Graduation) 25 Sep 2026, Shift-I

(a) $20x$ (b) $40x$ (c) $50x$ (d) $100x$

24 If $a+b=5$ and $ab=6$, then find a^3+b^3.

SSC Phase-XIV (Graduation) 25 Sep 2026, Shift-I

(a) 35 (b) 36 (c) 40 (d) 45

25 If $x=6-3\sqrt{3}$, then what is the value of $\left(\sqrt{x}-\frac{3}{\sqrt{x}}\right)^2$?

SSC Phase-XIV (Graduation) 25 Sep 2026, Shift-I

(a) 1 (b) 2 (c) 4 (d) 6

26 If $x+\frac{1}{x}=2\sqrt{5}$, then find the value of $\frac{2x}{x^2-1}$.

SSC Phase-XIV (Graduation) 25 Sep 2026, Shift-I

(a) 1/2 (b) 3/4 (c) 5/6 (d) 7/8

27 If $x=531$, $y=-295$ and $z=-231$, then find the value of $\frac{(x-y)^2+(y-z)^2+(z-x)^2}{x^3+y^3+z^3-3xyz}$.

SSC Phase-XIV (12th) 16 Sep 2026, Shift-II

(a) 0.6 (b) 0.4 (c) 0.5 (d) 0.3

28 Simplify: $\frac{(a^2-b^2)^3+(b^2-c^2)^3+(c^2-a^2)^3}{(a-b)^3+(b-c)^3+(c-a)^3}$.

SSC Phase-XIV (12th) 16 Sep 2026, Shift-II

(a) $(a-b)(b+c)(c+a)$ (b) $(a-b)(b-c)(c-a)$
(c) $(a+b)(b+c)(c+a)$ (d) $(a+b)(b+c)(c-a)$

29 The product of a number and its square is 729. Find the number.

SSC Phase-XIV (12th) 16 Sep 2026, Shift-II

(a) 9 (b) 3 (c) 2 (d) 6

30 $\sqrt{6+\sqrt{6+\sqrt{6+\cdots}}}$ is equal to:

SSC Phase-XIV (12th) 16 Sep 2026, Shift-II

(a) 3 (b) 5 (c) 6 (d) 2

31 If $\frac{k^{36}+1}{k^{18}}=11$, then find the value of $\frac{k^{72}+1}{k^{36}}$.

SSC Phase-XIV (12th) 18 Sep 2026, Shift-II

(a) 131 (b) 119 (c) 124 (d) 121

32 If $x^2-6x+1=0$, then find the value of $x^4+\frac{1}{x^4}$.

SSC Phase-XIV (12th) 18 Sep 2026, Shift-II

(a) 1150 (b) 1152 (c) 1154 (d) 1156

33 Simplify: $\frac{\sqrt{7+4\sqrt{3}}-\sqrt{7-4\sqrt{3}}}{2}$

SSC Phase-XIV (12th) 18 Sep 2026, Shift-II

(a) $6\sqrt{3}$ (b) $\sqrt{2}$ (c) $\sqrt{3}$ (d) $2\sqrt{3}$

34 x and y are positive integers such that $x^4+y^4+x^2y^2=473$ and $xy=16$. What is the value of x^2+xy+y^2?

SSC Phase-XIV (12th) 19 Sep 2026, Shift-II

(a) 52 (b) 43 (c) 15 (d) 37

35 If $3x=a+b+c$, then find the value of $(x-a)^3+(x-b)^3+(x-c)^3-3(x-a)(x-b)(x-c)$.

SSC Phase-XIV (12th) 19 Sep 2026, Shift-II

(a) $a+b+c$ (b) $(a-b)(b-c)(c-a)$
(c) 0 (d) $a+b-c$

36 The product of a positive number and its square is 1331. What is the number?

SSC Phase-XIV (12th) 19 Sep 2026, Shift-II

(a) 11 (b) 13 (c) 17 (d) 19

37 Find the value of: $\sqrt{6+\sqrt{6+\sqrt{6+\cdots\infty}}}$.

SSC Phase-XIV (12th) 19 Sep 2026, Shift-II

(a) 6 (b) 3 (c) 8 (d) 9

38 If $a=\sqrt{3481}$ and $b=\sqrt{2209}$, then find the value of $(a^2-b^2)\div(a-b)$.

SSC Phase-XIV (12th) 19 Sep 2026, Shift-II

(a) 96 (b) 104 (c) 106 (d) 112

39 If the square of a number is 3969, then what is the square root of the square of twice that number?

SSC Phase-XIV (12th) 21 Sep 2026, Shift-II

(a) 126 (b) 136 (c) 124 (d) 144

40 The sum of three numbers is zero and the sum of their squares is 36. What is the sum of the products of these numbers taken two at a time?

SSC Phase-XIV (12th) 21 Sep 2026, Shift-II

(a) -18 (b) -9 (c) 9 (d) 18

41 Given the equations $3x+4y=10$ and $-x+2y=0$, where (a, b) is the solution, find the value of $a+b$.

SSC Phase-XIV (12th) 22 Sep 2026, Shift-II

(a) 4 (b) 2 (c) 3 (d) 1

42 A gardener has several flower pots. He decides to put as many flowers in each pot as the total number of pots he has. After arranging all the flowers, he finds that exactly 12 baskets of 75 flowers each have been fully used. Find the number of pots.

SSC Phase-XIV (12th) 23 Sep 2026, Shift-II

(a) 30 (b) 28 (c) 32 (d) 25

43 If $a+b+c=3$ and $a^2+b^2+c^2=16$, find the value of $(a-b)^2+(b-c)^2+(c-a)^2$.

SSC Phase-XIV (12th) 23 Sep 2026, Shift-II

(a) 32 (b) 39 (c) 26 (d) 28

44 A number is increased by $2\frac{1}{3}$ of itself. Then $\frac{3}{10}$ of the new value is subtracted and the result becomes 147. What was the original number?

SSC Phase-XIV (12th) 23 Sep 2026, Shift-II

(a) 54 (b) 63 (c) 70 (d) 81

45 What is the missing number in the equation: $8+_\times 3=20$?

SSC Phase-XIV (12th) 24 Sep 2026, Shift-II

(a) 2 (b) 4 (c) 6 (d) 5

46 Two twins, Alpha and Beta, were asked to calculate the squares of numbers placed symmetrically around an unknown number x. According to the given problem => $(x+3)^2-(x-3)^2$?

SSC Phase-XIV (12th) 24 Sep 2026, Shift-II

(a) 6x (b) 9x (c) 12x (d) 18x

47 Given the equations $5x+2y=16$ and $3x-2y=0$, where (a, b) is the solution, find the value of a^2-b.

SSC Phase-XIV (12th) 25 Sep 2026, Shift-II

(a) 2 (b) 1 (c) 6 (d) 4

48 If $x=\sqrt{7}+\sqrt{3}$, find the exact value of $x^2+\frac{16}{x^2}$.

SSC Phase-XIV (12th) 25 Sep 2026, Shift-II

(a) 24 (b) 20 (c) 22 (d) 18

49 A gardener plants some trees in the form of a complete rectangle. The number of trees in each row is 6 more than the number of rows. If the total number of trees planted is 135, find the number of rows.

SSC Phase-XIV (12th) 26 Sep 2026, Shift-I

(a) 8 (b) 9 (c) 7 (d) 2

50 If $y = +1$, what is the value of $1 + (1/y) + (1/y^2) - (1/y^3) + (1/y^4) - (1/y^5)$?

SSC Phase-XIV (12th) 26 Sep 2026, Shift-I

(a) 2 (b) -1 (c) 0 (d) 4

51 If $\sqrt{8^n} = 512$, what is the value of n?

SSC Phase-XIV (12th) 26 Sep 2026, Shift-I

(a) 8 (b) 3 (c) 4 (d) 6

52 The difference between two numbers is 1570, and when the larger number is divided by the smaller number, the quotient is 7 and the remainder is 10. Find the larger number.

SSC Phase-XIV (Matric) 18 Sep 2026, Shift-III

(a) 1830 (b) 1820 (c) 1580 (d) 1750

53 The difference between the areas of two squares is 480 sq cm. If the side of one square is 8 cm more than the side of the other, find the sum of their perimeters.

SSC Phase-XIV (Matric) 18 Sep 2026, Shift-III

(a) 220 cm (b) 180 cm (c) 200 cm (d) 240 cm

54 The difference between two numbers is 1080. When the larger number is divided by the smaller number, the quotient is 5 and the remainder is 20. Find the smaller number.

SSC Phase-XIV (Matric) 21 Sep 2026, Shift-III

(a) 245 (b) 265 (c) 350 (d) 380

55 The sum of two numbers is 1260. If the larger number is divided by the smaller number, the quotient is 8 and the remainder is 45. What is the difference between the two numbers?

SSC Phase-XIV (Matric) 22 Sep 2026, Shift-III

(a) 860 (b) 990 (c) 450 (d) 520

56 A number is multiplied by itself and then 175 is added to the result. If the final value is 800, what is the number?

SSC Phase-XIV (Matric) 24 Sep 2026, Shift-III

(a) 15 (b) 20 (c) 25 (d) 30

Answer Key *SSC official key*

Algebra (Q. 01–56)

01	(d)	02	(c)	03	(c)	04	(a)	05	(a)	06	(b)	07	(a)	08	(d)	09	(d)	10	(a)
11	(a)	12	(d)	13	(b)	14	(c)	15	(a)	16	(a)	17	(b)	18	(b)	19	(d)	20	(d)
21	(a)	22	(b)	23	(b)	24	(a)	25	(d)	26	(a)	27	(b)	28	(c)	29	(a)	30	(a)
31	(b)	32	(c)	33	(c)	34	(b)	35	(c)	36	(a)	37	(b)	38	(c)	39	(a)	40	(a)
41	(c)	42	(a)	43	(b)	44	(b)	45	(b)	46	(c)	47	(b)	48	(b)	49	(b)	50	(a)
51	(d)	52	(a)	53	(d)	54	(b)	55	(b)	56	(c)								

Detailed Explanations रटना बंद, समझना शुरू

Algebra

01 **ANSWER (d)** 54

SSC Phase-XIV (Graduation) 17 Sep 2026, Shift-I

Concept: Square Root If $x^2 = k$, then $x = \pm\sqrt{k}$

$\frac{x^2}{27 \times 108} = 1$, that is $x^2 = 2916$

Write $27 \times 108 = 27 \times 27 \times 4$. So $x = 27 \times 2 = 54$ (we take the positive value). The options have **54**.

Short Trick The moment you see $27 \times 108 = (27 \times 2)^2$, the square root 54 is right in front of you. No need to

multiply.

02 **ANSWER (c)** 2

SSC Phase-XIV (Graduation) 17 Sep 2026, Shift-I

Concept: x + 1/x = 2 If $a+\frac{1}{a}=2$, then $a=1$ is the only possibility.

Because $a^2-2a+1=0$, that is $(a-1)^2=0$, so $a=1$

Now whatever the power, any power of 1 stays 1: $1^{2021}+\frac{1}{1^{2027}}=1+1=2$. The answer is **2**.

03 **ANSWER (c)** 133

SSC Phase-XIV (Graduation) 17 Sep 2026, Shift-I

Formula: Difference of Cubes $a^3-b^3=(a-b)(a^2+ab+b^2)$

Here $a=2x$, $b=3y$. So
$8x^3-27y^3=(2x-3y)(4x^2+6xy+9y^2)$

On comparing, $M=4$, $N=9$, $O=6$.

$M^2+N^2+O^2=16+81+36=133$, that is **133**.

Examiner's Trap The middle term is $ab=6xy$, not $3xy$. In a^3-b^3 the full ab comes in. Don't divide it by anything.

04 **ANSWER (a)** 92

SSC Phase-XIV (Graduation) 18 Sep 2026, Shift-I

Square both sides: $x+8=100$

$x=100-8=92$. Check: $\sqrt{100}=10$ ✓. So x = **92**.

05 **ANSWER (a)** 7

SSC Phase-XIV (Graduation) 18 Sep 2026, Shift-I

Formula: Square $x^2+\frac{1}{x^2}=\left(x+\frac{1}{x}\right)^2-2$

$3^2-2=9-2=7$, so the value is **7**.

Examiner's Trap Writing just $3^2=9$ and stopping there is wrong. Don't forget to subtract 2.

06 **ANSWER (b)** $7x$ and $9x$

SSC Phase-XIV (Graduation) 18 Sep 2026, Shift-I

Concept: Like Terms Like terms are terms whose **variable part**, that is, the variables and their powers, is exactly the same. The coefficients can be different.

(A) In $7x$ and $7y$ the variables themselves are different, x and y. So these are not like terms.
(C) $7xz$ and (D) $7xy$ have an extra variable attached to the second term, so these are out too.

Now look at (B). In both $7x$ and $9x$ the variable part is just x. The only difference is the coefficient, 7 and 9.
So the answer is $7x$ **and** $9x$.

Examiner's Trap The coefficient 7 is kept the same in three options so that you get caught by it. Remember, like terms are identified by the variable part, not by the coefficient.

07 **ANSWER (a)** 9

SSC Phase-XIV (Graduation) 19 Sep 2026, Shift-I

Formula: a^3+b^3 $a^3+b^3=(a+b)^3-3ab(a+b)$

First work out the two parts separately:
$(a+b)^3=3^3=27$ and $3ab(a+b)=3\times2\times3=18$

Now subtract: $a^3+b^3=27-18=9$
So the value is **9**.

Short Trick If the sum is 3 and the product is 2, the numbers are simply 1 and 2. $1^3+2^3=1+8=9$, done.

08 **ANSWER (d)** 781

SSC Phase-XIV (Graduation) 19 Sep 2026, Shift-I

Formula: x + 1/x = k If $x+\frac{1}{x}=k$, then $x^2+\frac{1}{x^2}=k^2-2$ and $x^3+\frac{1}{x^3}=k^3-3k$

Here $k=9$. The square part: $x^2+\frac{1}{x^2}=81-2=79$

The cube part: $x^3+\frac{1}{x^3}=9^3-3\times9=729-27=702$

The question asks for the total of both:
$702+79=781$
That makes option (d) **781** correct.

Examiner's Trap Stopping as soon as you get 702. Option (a) has 702 just for this mistake. Read the question again, it asks for the sum of both expressions.

09 **ANSWER (d)** $a^2+c^2=2b^2$

SSC Phase-XIV (Graduation) 21 Sep 2026, Shift-I

Concept: AP and GP Rules In an AP, $a+c=2b$. In a GP, the square of the middle term = the product of the other two, that is, $(b^2)^2=a^2c^2$

From the GP we get $b^4 = a^2c^2$. All the numbers are positive, so directly $b^2 = ac$

Now square the AP condition $a + c = 2b$:
$(a + c)^2 = 4b^2 = 4ac$
This gives $(a - c)^2 = 0$, so $a = c$ and then $b = a$ as well.
In other words, all three are equal, $a = b = c$.

Since all three are equal, $a^2 + c^2 = b^2 + b^2 = 2b^2$, which fits perfectly.
Other options: (A) The sum of positive numbers cannot be 0. (B) $abc = 0$ is not possible. (C) It would give $b = 2b$, which is wrong.
The correct option is $a^2 + c^2 = 2b^2$.

Short Trick Take a simple example, like $a = b = c = 1$. This is an AP as well as a GP. Now put it in the options, only (D) fits.

10 ANSWER (a) 5

SSC Phase-XIV (Graduation) 21 Sep 2026, Shift-I

First move 5 to the other side: $3x = 20 - 5 = 15$

Now divide by 3: $x = \frac{15}{3} = 5$
So the value of x is **5**.

11 ANSWER (a) 100

SSC Phase-XIV (Graduation) 21 Sep 2026, Shift-I

Formula: (a+b)² $a^2 + 2ab + b^2 = (a + b)^2$

Look carefully, this is exactly the form of this formula. Here $a = 7$ and $b = 3$, so the whole expression $= (7 + 3)^2$

$(10)^2 =$ **100**

Short Trick You can also add directly:
$49 + 42 + 9 = 100$. But once you spot the formula, the work is over in one line.

12 ANSWER (d) Infinitely many

SSC Phase-XIV (Graduation) 21 Sep 2026, Shift-I

Concept: Two-Variable Eqn. A single linear equation in two variables forms a straight line on a graph, and a line has countless points on it.

Put any value of x and you will get y from $y = \frac{3x - 6}{2}$. For example, $(2, 0)$, $(0, -3)$, $(4, 3)$ are all solutions, and you can make as many as you like.

So there is no limit to the number of solutions.

Answer: **Infinitely many**.

Examiner's Trap An equation in one variable, like $3x = 6$, has only one solution. Applying the same idea here and choosing 'One' is a very common mistake.

13 ANSWER (b) 32

SSC Phase-XIV (Graduation) 22 Sep 2026, Shift-I

Multiply the two fractions: $\frac{x}{16} \times \frac{x}{64} = 1$, so
$x^2 = 16 \times 64 = 1024$

$x = \sqrt{1024} = 32$ (the options have only the positive value)
So **32** is correct.

Short Trick No need to go up to 1024 at all.
$\sqrt{16 \times 64} = 4 \times 8 = 32$, straight away.

14 ANSWER (c) 140

SSC Phase-XIV (Graduation) 22 Sep 2026, Shift-I

Formula: k − 1/k $k^3 - \frac{1}{k^3} = \left(k - \frac{1}{k}\right)^3 + 3\left(k - \frac{1}{k}\right)$

Putting in the value: $5^3 + 3 \times 5 = 125 + 15$

$= 140$, that is, option (c) **140**.

Examiner's Trap Out of habit from the $x + \frac{1}{x}$ formula, many students subtract $3k$ here too. Note that in the minus form, $3k$ is added.

15 ANSWER (a) 4

SSC Phase-XIV (Graduation) 22 Sep 2026, Shift-I

Formula: Square Relations $x^4 + \frac{1}{x^4} = \left(x^2 + \frac{1}{x^2}\right)^2 - 2$ and $\left(x - \frac{1}{x}\right)^2 = x^2 + \frac{1}{x^2} - 2$

First come down one step: $\left(x^2 + \frac{1}{x^2}\right)^2 = 322 + 2 = 324$, so $x^2 + \frac{1}{x^2} = 18$

Now one more step: $\left(x - \frac{1}{x}\right)^2 = 18 - 2 = 16$, that is, $x - \frac{1}{x} = \pm 4$

$x > 1$ is given, so x will always be greater than $\frac{1}{x}$ and the difference will be positive.
The value is **4**.

Short Trick Work backwards and check the option: $4^2 + 2 = 18$, then $18^2 - 2 = 322$. It matches, so it is 4.

16 **ANSWER (a)** $(x-5)^2$

SSC Phase-XIV (Graduation) 23 Sep 2026, Shift-I

Formula: (a−b)² $a^2-2ab+b^2=(a-b)^2$

Write the expression in this form:
$x^2-10x+25=x^2-2\times x\times 5+5^2$

This is clearly the expansion of $(x-5)^2$.
So the factorised form is $(x-5)^2$.

Short Trick The square root of the last term 25 is 5, so only 5 can go in the bracket. The other three options get cut at a glance.

17 **ANSWER (b)** -4

SSC Phase-XIV (Graduation) 23 Sep 2026, Shift-I

Take the x terms to one side and the numbers to the other: $-7+3=5x-4x$

The left side is -4 and the right side is x, so $x=$ **-4**

Examiner's Trap If you forget to change the sign while shifting sides, you get $x=4$. Option (a) is there to catch exactly this mistake.

18 **ANSWER (b)** $x^2+2xy+y^2$

SSC Phase-XIV (Graduation) 23 Sep 2026, Shift-I

Formula: (a+b)² $(a+b)^2=a^2+2ab+b^2$

Simply put $a=x$ and $b=y$: $(x+y)^2=x^2+2xy+y^2$
The correct option is (b) $x^2+2xy+y^2$.

Examiner's Trap Writing $(x+y)^2=x^2+y^2$ is the oldest mistake in the book. Never leave out the middle $2xy$.

19 **ANSWER (d)** 5

SSC Phase-XIV (Graduation) 23 Sep 2026, Shift-I

Formula: (a + 1/a)² $\left(a+\frac{1}{a}\right)^2=a^2+\frac{1}{a^2}+2$

Square both sides: $\left(\sqrt{x}+\frac{1}{\sqrt{x}}\right)^2=7$, that is,
$x+\frac{1}{x}+2=7$

Send 2 to the other side: $x+\frac{1}{x}=7-2=5$
Answer: **5**.

20 **ANSWER (d)** 16

SSC Phase-XIV (Graduation) 23 Sep 2026, Shift-I

Formula: (x + 1/x)² $\left(x+\frac{1}{x}\right)^2=x^2+\frac{1}{x^2}+2$

Just put in the value: $14+2=16$
So the answer comes to **16**.

Examiner's Trap Subtracting 2, as in the minus formula $\left(x-\frac{1}{x}\right)^2$, and taking 12. Remember, in the plus form, 2 is added.

21 **ANSWER (a)** 2

SSC Phase-XIV (Graduation) 24 Sep 2026, Shift-I

Concept: x + 1/x = 2 Whenever you see $x+\frac{1}{x}=2$, understand that $x=1$.

Here is the reason too: $x+\frac{1}{x}=2$ gives $x^2-2x+1=0$, that is, $(x-1)^2=0$, so $x=1$

Any power of 1 stays 1: $1^7+\frac{1}{1^{117}}=1+1=$ **2**

Short Trick In the exam, don't even solve this much. Put $x=1$. Whether the power is 7 or 117, the answer will be $1+1=2$.

22 **ANSWER (b)** 2450

SSC Phase-XIV (Graduation) 24 Sep 2026, Shift-I

Formula: Sum of Squares
$p^2+q^2+r^2=(p+q+r)^2-2(pq+qr+rp)$

First, the sum of squares: $p^2+q^2+r^2=0-2(-35)=70$

Next we need the sum of the squares of the products:
$p^2q^2+q^2r^2+r^2p^2=(pq+qr+rp)^2-2pqr(p+q+r)=(-35)^2-0=1225$

Now the fourth power:
$p^4+q^4+r^4=(p^2+q^2+r^2)^2-2(p^2q^2+q^2r^2+r^2p^2)$
$=70^2-2\times 1225=4900-2450=2450$
So option (b) **2450** is correct.

Short Trick Remember this result: when $p+q+r=0$, then $p^4+q^4+r^4=2(pq+qr+rp)^2$. Here $2\times 1225=2450$, in one line.

23 **ANSWER (b)** $40x$

SSC Phase-XIV (Graduation) 25 Sep 2026, Shift-I

Formula: (a+b)² − (a−b)² $(a+b)^2-(a-b)^2=4ab$

Here $a=5x$ and $b=2$.

$4\times 5x\times 2=40x$

Examiner's Trap Taking only the middle term $2ab$ and stopping at $20x$. When you subtract the two

squares, $2ab$ comes twice, so the total is $4ab$.

24 **ANSWER (a)** 35

SSC Phase-XIV (Graduation) 25 Sep 2026, Shift-I

Formula: a³ + b³ $a^3+b^3=(a+b)^3-3ab(a+b)$

Put in the values: $5^3-3\times6\times5=125-90$

$=35$

So the correct option is (a) **35**.

Short Trick Sum 5 and product 6 means the numbers are 2 and 3. Now $8+27=35$, no formula needed.

25 **ANSWER (d)** 6

SSC Phase-XIV (Graduation) 25 Sep 2026, Shift-I

Formula: (a−b)² $\left(\sqrt{x}-\frac{3}{\sqrt{x}}\right)^2=x+\frac{9}{x}-6$

First of all, find $\frac{9}{x}$. Since $x=3(2-\sqrt{3})$,

$\frac{9}{x}=\frac{9}{3(2-\sqrt{3})}=\frac{3(2+\sqrt{3})}{(2-\sqrt{3})(2+\sqrt{3})}=6+3\sqrt{3}$

(The denominator becomes $=4-3=1$, which is why the calculation came out so clean.)

Now add, and the root parts will cancel:

$x+\frac{9}{x}=(6-3\sqrt{3})+(6+3\sqrt{3})=12$

Finally subtract 6: $12-6=6$

That gives **6**.

26 **ANSWER (a)** 1/2

SSC Phase-XIV (Graduation) 25 Sep 2026, Shift-I

Concept: Divide Both by x $\frac{2x}{x^2-1}=\frac{2}{x-\frac{1}{x}}$

So all we need is $x-\frac{1}{x}$:

$\left(x-\frac{1}{x}\right)^2=\left(x+\frac{1}{x}\right)^2-4=20-4=16$, that is, $x-\frac{1}{x}=\pm4$

Take $x>1$, that is, $x=\sqrt{5}+2$. Then $x-\frac{1}{x}=4$ and the value is $\frac{2}{4}=\frac{1}{2}$

The question does not state $x>1$, so the wording is a little incomplete. Taking $x=\sqrt{5}-2$ gives $-\frac{1}{2}$, which is not even in the options.

So in the exam, **1/2** was taken as the answer.

27 **ANSWER (b)** 0.4

SSC Phase-XIV (12th) 16 Sep 2026, Shift-II

Formula: x³+y³+z³−3xyz $x^3+y^3+z^3-3xyz=\frac{1}{2}(x+y+z)[(x-y)^2+(y-z)^2+(z-x)^2]$

The bracket in the numerator appears both above and below, so it cancels. What remains is $\frac{2}{x+y+z}$

Now just find the sum: $x+y+z=531-295-231=5$

$\frac{2}{5}=0.4$

The correct option is **0.4**.

Short Trick Don't panic on seeing such big numbers. In the exam, questions like this only need you to find $x+y+z$. The formula handles the rest.

28 **ANSWER (c)** $(a+b)(b+c)(c+a)$

SSC Phase-XIV (12th) 16 Sep 2026, Shift-II

Rule: Sum Equals Zero If $X+Y+Z=0$, then $X^3+Y^3+Z^3=3XYZ$

Add the three brackets in the numerator:

$(a^2-b^2)+(b^2-c^2)+(c^2-a^2)=0$

So the numerator $=3(a^2-b^2)(b^2-c^2)(c^2-a^2)$

The denominator is the same story:

$(a-b)+(b-c)+(c-a)=0$, so the denominator $=3(a-b)(b-c)(c-a)$

Break each bracket of the numerator like $(a-b)(a+b)$ and cancel:

$\frac{3(a-b)(a+b)(b-c)(b+c)(c-a)(c+a)}{3(a-b)(b-c)(c-a)}=(a+b)(b+c)(c+a)$

So option (c) $(a+b)(b+c)(c+a)$ is correct.

29 **ANSWER (a)** 9

SSC Phase-XIV (12th) 16 Sep 2026, Shift-II

Let the number be n. Number × its square $=n\times n^2=n^3=729$

$n=\sqrt[3]{729}=9$, because $9^3=729$

So the number is **9**.

Examiner's Trap Seeing 729 as 3^6 and ticking 3. Check it, $3\times3^2=27$, not 729.

30 **ANSWER (a)** 3

SSC Phase-XIV (12th) 16 Sep 2026, Shift-II

Concept: Infinite Root $y=\sqrt{a+y}$ gives $y^2-y-a=0$

Let the whole expression be y. The same y repeats inside, so $y=\sqrt{6+y}$, that is, $y^2=6+y$ and $y^2-y-6=0$

$(y-3)(y+2)=0$. A square root cannot be negative, so

$y = 3$

Short Trick In $\sqrt{a+\sqrt{a+\cdots}}$, break a into the product of two consecutive numbers. $6 = 2 \times 3$, so the answer is the bigger number, 3.

31 ANSWER (b) 119

SSC Phase-XIV (12th) 18 Sep 2026, Shift-II

Formula: u + 1/u $u^2 + \frac{1}{u^2} = \left(u + \frac{1}{u}\right)^2 - 2$

Don't be scared of the big powers. Let $u = k^{18}$. Then $\frac{k^{36}+1}{k^{18}} = u + \frac{1}{u} = 11$, and what is asked is $u^2 + \frac{1}{u^2}$.

$u^2 + \frac{1}{u^2} = 11^2 - 2 = 121 - 2 = 119$

Answer: **119**.

Examiner's Trap Just squaring and stopping at 121. Option (d) has 121 sitting there for this, so don't forget to subtract 2.

32 ANSWER (c) 1154

SSC Phase-XIV (12th) 18 Sep 2026, Shift-II

Formula: x + 1/x If $x^2 - kx + 1 = 0$, then $x + \frac{1}{x} = k$

Divide the whole equation by x: $x - 6 + \frac{1}{x} = 0$, so $x + \frac{1}{x} = 6$

Next step: $x^2 + \frac{1}{x^2} = 6^2 - 2 = 34$

Square once more and subtract 2:

$x^4 + \frac{1}{x^4} = 34^2 - 2 = 1156 - 2 = 1154$

So the correct option is (c) **1154**.

Examiner's Trap Ticking (d) as soon as you write $34^2 = 1156$. You have to subtract 2 in the last step as well.

33 ANSWER (c) $\sqrt{3}$

SSC Phase-XIV (12th) 18 Sep 2026, Shift-II

Concept: Perfect Squares

$7 \pm 4\sqrt{3} = 4 + 3 \pm 2 \times 2 \times \sqrt{3} = (2 \pm \sqrt{3})^2$

So both roots open up directly: $\sqrt{7+4\sqrt{3}} = 2 + \sqrt{3}$ and $\sqrt{7-4\sqrt{3}} = 2 - \sqrt{3}$ (here $2 > \sqrt{3}$, so this stays positive)

Now subtract: $(2+\sqrt{3}) - (2-\sqrt{3}) = 2\sqrt{3}$

Dividing by the 2 below is still left, so the value that remains is $\sqrt{3}$.

Examiner's Trap Choosing (d) as soon as the numerator comes to $2\sqrt{3}$. The 2 in the denominator is still pending.

34 ANSWER (b) 43

SSC Phase-XIV (12th) 19 Sep 2026, Shift-II

Formula: $a^4+a^2b^2+b^4$

$x^4 + x^2y^2 + y^4 = (x^2 + xy + y^2)(x^2 - xy + y^2)$

Let $s = x^2 + y^2$. Then

$x^4 + y^4 + x^2y^2 = s^2 - x^2y^2 = s^2 - 256$

This is given as 473: $s^2 - 256 = 473$, so $s^2 = 729$ and $s = 27$

Now the expression asked:

$x^2 + xy + y^2 = s + xy = 27 + 16 =$ **43**

Short Trick Directly from the formula: $(s+16)(s-16) = 473 = 43 \times 11$. The bigger factor is $x^2 + xy + y^2$, that is, 43.

35 ANSWER (c) 0

SSC Phase-XIV (12th) 19 Sep 2026, Shift-II

Rule: Sum Equals Zero If $p + q + r = 0$, then $p^3 + q^3 + r^3 - 3pqr = 0$

Give the brackets short names: $p = x - a$, $q = x - b$, $r = x - c$

Their sum: $p + q + r = 3x - (a + b + c) = 0$, because $3x = a + b + c$ is given.

The sum is zero, so the whole expression $p^3 + q^3 + r^3 - 3pqr$ becomes **0** straight away.

36 ANSWER (a) 11

SSC Phase-XIV (12th) 19 Sep 2026, Shift-II

Let the number be n. $n \times n^2 = n^3 = 1331$

$n = \sqrt[3]{1331} = 11$, because $11^3 = 1331$

So the number is **11**.

Short Trick The unit digit of 1331 is 1. A cube ends in 1 only when the number also ends in 1. Among the options, only 11 does.

37 ANSWER (b) 3

SSC Phase-XIV (12th) 19 Sep 2026, Shift-II

Concept: Infinite Root $y = \sqrt{a+y}$ gives $y^2 = a + y$

Here, let $y=\sqrt{6+y}$. Then $y^2-y-6=0$, that is, $(y-3)(y+2)=0$

A square root has a positive value, so we cannot take -2.
The value is **3**.

Short Trick $6=2\times3$, two consecutive numbers. In an infinite root with '+', the answer is the bigger number, that is, 3. The previous question was the same one. This type comes again and again in the exam.

38 ANSWER (c) 106

SSC Phase-XIV (12th) 19 Sep 2026, Shift-II

Formula: Diff. of Squares $\frac{a^2-b^2}{a-b}=a+b$

First find both square roots: $a=\sqrt{3481}=59$ (because $59^2=3481$) and $b=\sqrt{2209}=47$ (because $47^2=2209$)

By the formula we just need the sum: $59+47=106$
So option (c) **106** is correct.

39 ANSWER (a) 126

SSC Phase-XIV (12th) 21 Sep 2026, Shift-II

Let the number be n. $n^2=3969$, so $n=63$

Twice the number is $2n$, and the square root of its square gives back $2n$: $\sqrt{(2n)^2}=2n$

$2\times63=$ **126**

Short Trick Square and square root cancel each other. So directly $2\sqrt{3969}=2\times63=126$.

40 ANSWER (a) -18

SSC Phase-XIV (12th) 21 Sep 2026, Shift-II

Formula: (a+b+c)²
$(a+b+c)^2=a^2+b^2+c^2+2(ab+bc+ca)$

Let the three numbers be a, b, c. We are given $a+b+c=0$ and $a^2+b^2+c^2=36$.

Put these in the formula: $0^2=36+2(ab+bc+ca)$
$\Rightarrow 2(ab+bc+ca)=-36\Rightarrow ab+bc+ca=-18$
So the answer is **-18**.

Examiner's Trap When the sum is zero, the sum of the products taken two at a time can never be positive. It will be negative or zero. Forgetting the sign and ticking 18 is the most common mistake.

41 ANSWER (c) 3

SSC Phase-XIV (12th) 22 Sep 2026, Shift-II

The second equation gives it directly:
$-x+2y=0\Rightarrow x=2y$

Put this in the first one:
$3(2y)+4y=10\Rightarrow 10y=10\Rightarrow y=1$, so $x=2$

$a+b=2+1=3$, that is **3**.

42 ANSWER (a) 30

SSC Phase-XIV (12th) 23 Sep 2026, Shift-II

Let the number of pots be n. Each pot also gets n flowers, so total flowers $=n\times n=n^2$

Total flowers $=12\times75=900$
$n^2=900\Rightarrow n=30$
The gardener has **30** pots.

Short Trick Just look for the option whose square is 900. $30^2=900$, and you are done.

43 ANSWER (b) 39

SSC Phase-XIV (12th) 23 Sep 2026, Shift-II

Identity
$(a-b)^2+(b-c)^2+(c-a)^2=2(a^2+b^2+c^2)-2(ab+bc+ca)$

First find $ab+bc+ca$:
$(a+b+c)^2=9\Rightarrow 16+2(ab+bc+ca)=9\Rightarrow 2(ab+bc+ca)=-7$

Now put it in the identity: $2\times16-(-7)=32+7=39$
The correct option is **39**.

Short Trick Remember this direct formula:
$(a-b)^2+(b-c)^2+(c-a)^2=3(a^2+b^2+c^2)-(a+b+c)^2=48-9=39$. The answer in one line.

44 ANSWER (b) 63

SSC Phase-XIV (12th) 23 Sep 2026, Shift-II

Let the number be n. $2\frac{1}{3}=\frac{7}{3}$, so the new value after the increase $=n+\frac{7}{3}n=\frac{10}{3}n$

Now $\frac{3}{10}$ of it is subtracted, which means $\frac{7}{10}$ is left:
$\frac{7}{10}\times\frac{10}{3}n=\frac{7}{3}n$

$\frac{7}{3}n=147\Rightarrow n=147\times\frac{3}{7}=63$
The original number was **63**.

Short Trick The whole game is about $\frac{7}{3}$. Divide 147 by 7 and multiply by 3: $147 \div 7 \times 3 = 63$.

45 ANSWER (b) 4

SSC Phase-XIV (12th) 24 Sep 2026, Shift-II

Rule: BODMAS Multiplication first, then addition.

Take the missing number as x:
$8 + 3x = 20 \Rightarrow 3x = 12 \Rightarrow x = 4$
The blank takes **4**.

Examiner's Trap If you go left to right and make it $(8 + x) \times 3 = 20$, the answer will be wrong. BODMAS says multiplication comes first.

46 ANSWER (c) 12x

SSC Phase-XIV (12th) 24 Sep 2026, Shift-II

Identity $(a+b)^2 - (a-b)^2 = 4ab$

Here $a = x$ and $b = 3$: $(x+3)^2 - (x-3)^2 = 4 \times x \times 3 = 12x$
That makes **12x** the correct option.

47 ANSWER (b) 1

SSC Phase-XIV (12th) 25 Sep 2026, Shift-II

Add the two equations and y cancels out on its own:
$8x = 16 \Rightarrow x = 2$

Now put this in the second equation:
$3(2) - 2y = 0 \Rightarrow y = 3$

$a^2 - b = 4 - 3 = 1$
So the answer is **1**.

48 ANSWER (b) 20

SSC Phase-XIV (12th) 25 Sep 2026, Shift-II

First find x^2: $x^2 = 7 + 3 + 2\sqrt{21} = 10 + 2\sqrt{21}$

Now rationalise:
$\frac{16}{x^2} = \frac{16}{10+2\sqrt{21}} \times \frac{10-2\sqrt{21}}{10-2\sqrt{21}} = \frac{16(10-2\sqrt{21})}{100-84} = 10 - 2\sqrt{21}$

On adding, the $\sqrt{21}$ terms cancel:
$(10 + 2\sqrt{21}) + (10 - 2\sqrt{21}) = 20$
The exact value is **20**.

Short Trick Note that $(\sqrt{7} + \sqrt{3})(\sqrt{7} - \sqrt{3}) = 4$, so $\frac{4}{x} = \sqrt{7} - \sqrt{3}$. Now
$x^2 + \frac{16}{x^2} = (\sqrt{7} + \sqrt{3})^2 + (\sqrt{7} - \sqrt{3})^2 = 2(7 + 3) = 20$. No rationalising needed at all.

49 ANSWER (b) 9

SSC Phase-XIV (12th) 26 Sep 2026, Shift-I

Let the number of rows be r, so each row has r + 6 trees.
$r(r+6) = 135 \Rightarrow r^2 + 6r - 135 = 0$

$(r+15)(r-9) = 0 \Rightarrow r = 9$
Rows cannot be negative, so the answer is **9**.

Short Trick Find two factors of 135 that differ by 6: $135 = 9 \times 15$. The smaller one, 9, is the number of rows.

50 ANSWER (a) 2

SSC Phase-XIV (12th) 26 Sep 2026, Shift-I

Since $y = 1$, every power of $1/y$ stays 1.

Just add by looking at the signs:
$1 + 1 + 1 - 1 + 1 - 1 = 2$
The value comes to **2**.

Examiner's Trap Watch the signs. The third term is also (+), so + and − are not alternating. Assume a pattern and write 0 straight away, and you lose the mark.

51 ANSWER (d) 6

SSC Phase-XIV (12th) 26 Sep 2026, Shift-I

Rule: Exponents $\sqrt{a^m} = a^{m/2}$

$\sqrt{8^n} = 8^{n/2}$, and $512 = 8^3$

Equate the powers: $\frac{n}{2} = 3 \Rightarrow n = 6$
The value of n is **6**.

Examiner's Trap The moment you see $512 = 8^3$, you will feel like picking n = 3. That is the trap. The square root halves the power.

52 ANSWER (a) 1830

SSC Phase-XIV (Matric) 18 Sep 2026, Shift-III

Rule: Division Dividend = Divisor × Quotient + Remainder

Let the smaller number be S and the larger be L.
Then $L = 7S + 10$ and $L - S = 1570$

Substitute for L: $6S + 10 = 1570 \Rightarrow 6S = 1560 \Rightarrow S = 260$

$L = 260 + 1570 = 1830$
The larger number is **1830**.

53 **ANSWER (d)** 240 cm

SSC Phase-XIV (Matric) 18 Sep 2026, Shift-III

Identity $A^2 - B^2 = (A - B)(A + B)$

Let the sides be A and B. $(A - B)(A + B) = 480$ and $A - B = 8$
$\Rightarrow A + B = 60$

Sum of perimeters $= 4A + 4B = 4(A + B) = 4 \times 60 = 240$ cm
So the answer is **240 cm**.

Short Trick There is no need to find the sides separately. $A + B = 480 \div 8 = 60$, then just multiply by 4.

54 **ANSWER (b)** 265

SSC Phase-XIV (Matric) 21 Sep 2026, Shift-III

Take the smaller as S and the larger as L: $L = 5S + 20$ and $L - S = 1080$

Putting in the value of L gives
$4S + 20 = 1080 \Rightarrow 4S = 1060 \Rightarrow S = 265$
The smaller number is **265**.

55 **ANSWER (b)** 990

SSC Phase-XIV (Matric) 22 Sep 2026, Shift-III

Smaller S, larger L: $L = 8S + 45$ and $L + S = 1260$

$9S + 45 = 1260 \Rightarrow 9S = 1215 \Rightarrow S = 135$, $L = 1125$

Now the difference: $1125 - 135 = 990$
The answer is **990**.

Examiner's Trap The question asks for the difference. Don't stop after finding 135 or 1125.

56 **ANSWER (c)** 25

SSC Phase-XIV (Matric) 24 Sep 2026, Shift-III

Let the number be x:
$x^2 + 175 = 800 \Rightarrow x^2 = 625 \Rightarrow x = 25$
So the number is **25**.

19 CHAPTER
Progression

Questions *4 questions · 3 shifts*

Progression

Directions (Q. 01–04): *Choose the correct answer from the four given options.*

01 If the third and fifth terms of a geometric progression are 9 and 81 respectively, what is the sum of the first 4 terms?

SSC Phase-XIV (12th) 21 Sep 2026, Shift-II

(a) 40 (b) 120 (c) 111 (d) 102

02 Which of the following geometric progressions (G.P.) does NOT have a common ratio that is a perfect square?

SSC Phase-XIV (12th) 24 Sep 2026, Shift-II

(a) 1, 4, 16, 64, ...
(b) 2, 18, 162, 1458, ...
(c) 2, 2.88, 4.1472, ...
(d) 6, 21.6, 77.76, ...

03 If $2^2+4^2+6^2+8^2+\cdots+50^2=5525$, find the value of $1^2+2^2+3^2+\cdots+25^2=?$

SSC Phase-XIV (12th) 24 Sep 2026, Shift-II

(a) 1340.25 (b) 1215.25 (c) 1381.25 (d) 1524.75

04 What is the next term in the series 1, 4, 36, 576, _____?

SSC Phase-XIV (12th) 26 Sep 2026, Shift-I

(a) 3600 (b) 8100 (c) 12100 (d) 14400

Answer Key *SSC official key*

Progression (Q. 01–04)

01	(a)	02	(d)	03	(c)	04	(d)

Detailed Explanations रटना बंद, समझना शुरू

Progression

01 ANSWER (a) 40

SSC Phase-XIV (12th) 21 Sep 2026, Shift-II

Formula: nth Term of GP $T_n=ar^{n-1}$

$ar^2=9$ and $ar^4=81$. Divide the second by the first: $r^2=9\Rightarrow r=3$ (taking the positive value)

$a\times 9=9\Rightarrow a=1$. So the first 4 terms are 1, 3, 9, 27

Add them up: $1+3+9+27=40$. The sum is **40**.

02 ANSWER (d) 6, 21.6, 77.76, ...

SSC Phase-XIV (12th) 24 Sep 2026, Shift-II

Concept: Common Ratio $r=\frac{T_2}{T_1}$

(A) $r = 4 = 2^2$ ✓ | (B) $r = 9 = 3^2$ ✓ | (C) $r = \frac{2.88}{2} = 1.44 = (1.2)^2$ ✓

In (D), $r = \frac{21.6}{6} = 3.6$, which is not the square of any rational number ($\sqrt{3.6} \approx 1.897$)
So the odd GP out is **6, 21.6, 77.76, ...**

Examiner's Trap Don't take 3.6 as $(0.6)^2$. That would be 0.36. Look carefully at where the decimal point sits.

03 **ANSWER (c)** 1381.25

SSC Phase-XIV (12th) 24 Sep 2026, Shift-II

Take $2^2 = 4$ out of every term:
$2^2 + 4^2 + \cdots + 50^2 = 4(1^2 + 2^2 + \cdots + 25^2)$

$4(1^2 + \cdots + 25^2) = 5525 \Rightarrow 1^2 + \cdots + 25^2 = \frac{5525}{4} = 1381.25$
So the answer is **1381.25**.

Examiner's Trap To be honest, the formula $\frac{n(n+1)(2n+1)}{6}$ gives $1^2 + \cdots + 25^2 = 5525$ itself, so the figure in the question is faulty. But in the exam you have to work with what is given, so 1381.25.

04 **ANSWER (d)** 14400

SSC Phase-XIV (12th) 26 Sep 2026, Shift-I

Look at the ratio of consecutive terms: $\frac{4}{1} = 2^2$, $\frac{36}{4} = 3^2$, $\frac{576}{36} = 4^2$

Next, it gets multiplied by $5^2 = 25$: $576 \times 25 = 14400$
The next term is **14400**.

Short Trick All the terms are perfect squares: $1^2, 2^2, 6^2, 24^2$, that is $(1!)^2, (2!)^2, (3!)^2, (4!)^2$. The next is $(5!)^2 = 120^2 = 14400$

20 CHAPTER
Geometry

Questions *58 questions · 19 shifts*

Geometry

Directions (Q. 01–58): *Choose the correct answer from the four given options.*

01 In $\triangle ABC$, the lengths of the medians AD, BE and CF are 9 cm, 12 cm and 15 cm respectively. Find the area of $\triangle ABC$.

SSC Phase-XIV (Graduation) 17 Sep 2026, Shift-I

(a) 64 cm² (b) 52 cm² (c) 72 cm² (d) 85 cm²

02 In a circle of radius 17 cm, two parallel chords are drawn on opposite sides of the centre. One chord is 16 cm long and the distance between them is 23 cm. Find the difference between the lengths of the two chords (in cm).

SSC Phase-XIV (Graduation) 17 Sep 2026, Shift-I

(a) 10 cm (b) 14 cm (c) 18 cm (d) 22 cm

03 Suppose a triangle ABC circumscribes a circle of radius 4 cm. The segments BD and DC are 8 cm and 6 cm long respectively. Find the lengths of the sides AB and AC.

SSC Phase-XIV (Graduation) 17 Sep 2026, Shift-I

(a) 15 cm, 13 cm (b) 18 cm, 12 cm
(c) 19 cm, 12 cm (d) 22 cm, 18 cm

04 The length of a common external tangent of two circles is 9 and the length of a common internal tangent is 5. Find the product of the radii of the circles.

SSC Phase-XIV (Graduation) 17 Sep 2026, Shift-I

(a) 14 (b) 15 (c) 17 (d) 18

05 In an optics laboratory, two precise circular mirrors of radii 6 cm and 10 cm are mounted on a flat bench so that their centres are exactly 20 cm apart. A laser beam is directed so that it passes touching the edges of both mirrors externally as a tangent, forming a common tangent. What is the length of this common tangent between the two mirrors?

SSC Phase-XIV (Graduation) 18 Sep 2026, Shift-I

(a) 18.9 cm (b) 19 cm (c) 19.6 cm (d) 20 cm

06 A regular polygon has 9 sides. Find the measure of each interior angle.

SSC Phase-XIV (Graduation) 18 Sep 2026, Shift-I

(a) 120° (b) 135° (c) 140° (d) 147°

07 If the interior angle of a regular polygon = 179°, find the number of sides.

SSC Phase-XIV (Graduation) 18 Sep 2026, Shift-I

(a) 180 (b) 360 (c) 540 (d) 720

08 Two circular gears of radii 3 cm and 6 cm are mounted on a flat surface so that they touch each other externally. To fit a belt that runs straight from one gear to the other without wrapping, the engineer needs to determine the length of the common tangent between the two gears.

SSC Phase-XIV (Graduation) 18 Sep 2026, Shift-I

(a) 8.49 cm (b) 7.8 cm (c) 6.75 cm (d) 5 cm

09 In a satellite imaging system, two base stations A and B are located on the circumference of a circular ground station of radius 30 km. A satellite at point S on the minor arc AB monitors both

stations such that angle $ASB = 60^\circ$. A ground operator walks along the outer ring path (major arc AB) to find the location P from where the satellite S appears exactly between the two stations. Determine the maximum angle APB that can be observed by the operator.

SSC Phase-XIV (Graduation) 18 Sep 2026, Shift-I

(a) 90° (b) 75° (c) 60° (d) 120°

10 Two circles of radii 6 cm and 4 cm touch each other externally. How many common tangents can be drawn?

SSC Phase-XIV (Graduation) 18 Sep 2026, Shift-I

(a) 1 (b) 2 (c) 3 (d) 4

11 In a triangle ABC, D and E are points on sides AB and AC respectively such that $DE \parallel BC$. If $AD = x$, $DB = x - 2$, $AE = x + 2$ and $EC = x - 1$, find the value of x.

SSC Phase-XIV (Graduation) 19 Sep 2026, Shift-I

(a) 4 (b) 2 (c) 10 (d) 7

12 In a circle with centre O and radius 13 cm, two parallel chords AB and CD are drawn on opposite sides of the centre. If AB = 10 cm and CD = 24 cm, find the distance (in cm) between the two chords.

SSC Phase-XIV (Graduation) 19 Sep 2026, Shift-I

(a) 15 cm (b) 17 cm (c) 21 cm (d) 25 cm

13 Two circles intersect at points P and Q. Their common tangents AB and CD meet the line PQ, produced on both sides, at points X and Y respectively. If PQ = 8 cm and XY = 17 cm, find the length of AB (in cm).

SSC Phase-XIV (Graduation) 19 Sep 2026, Shift-I

(a) 12 cm (b) 13 cm (c) 14 cm (d) 15 cm

14 A point P is at a distance of 13 cm from the centre of a circle. If the radius of the circle is 5 cm, what is the length of the tangent segment drawn from P to the circle?

SSC Phase-XIV (Graduation) 19 Sep 2026, Shift-I

(a) 12 cm (b) 13 cm (c) 15 cm (d) 18 cm

15 What is the measure of each interior angle of a regular hexagon?

SSC Phase-XIV (Graduation) 21 Sep 2026, Shift-I

(a) 120° (b) 140° (c) 160° (d) 100°

16 A chord of length 16 cm is at a distance of 6 cm from the centre of a circle. Find the radius of the circle.

SSC Phase-XIV (Graduation) 21 Sep 2026, Shift-I

(a) 10 cm (b) 12 cm (c) 8 cm (d) 14 cm

17 Two chords AB and CD of a circle intersect internally at a point P. If angle APC = 50° and the minor arc AC subtends an angle of 60° at the centre, find the angle subtended at the centre by the minor arc BD.

SSC Phase-XIV (Graduation) 21 Sep 2026, Shift-I

(a) 35° (b) 40° (c) 45° (d) 50°

18 Two tangents are drawn from an external point T to a circle with centre O, touching it at A and B. If $\angle AOB = 120^\circ$, what is $\angle ATB$?

SSC Phase-XIV (Graduation) 21 Sep 2026, Shift-I

(a) 30° (b) 45° (c) 60° (d) 90°

19 Two circles intersect each other at points M and N. AB and CD are common tangents to the circles. Line MN, when extended on both sides, intersects the tangents AB and CD at points P and Q respectively. If MN = 3 cm and PQ = 5 cm, find the length of AB (in cm).

SSC Phase-XIV (Graduation) 21 Sep 2026, Shift-I

(a) 2 cm (b) 3 cm (c) 4 cm (d) 5 cm

20 If a regular polygon has 170 diagonals, what is the measure of each of its interior angles?

SSC Phase-XIV (Graduation) 22 Sep 2026, Shift-I

(a) 112° (b) 139° (c) 162° (d) 173°

21 In $\triangle ABC$, the internal bisectors of $\angle B$ and $\angle C$ meet at point O. If the exterior angle formed at vertex A on extending side BA is 130°, find the measure of $\angle BOC$.

SSC Phase-XIV (Graduation) 22 Sep 2026, Shift-I

(a) 115° (b) 120° (c) 110° (d) 125°

22 Two parallel chords are drawn on opposite sides of the centre of a circle of diameter 30 cm. The length of one chord is 24 cm and the perpendicular

distance between the two chords is 21 cm. Determine the length of the other chord.

SSC Phase-XIV (Graduation) 22 Sep 2026, Shift-I

(a) 9 cm (b) 12 cm (c) 18 cm (d) 24 cm

23 The length of the direct common tangent of two circles is 25 cm and the length of their transverse common tangent is 15 cm. Find the product of their radii.

SSC Phase-XIV (Graduation) 22 Sep 2026, Shift-I

(a) 60 (b) 80 (c) 100 (d) 120

24 PA and PB are tangents drawn from an external point P to a circle with centre O, and M is a point on the minor arc AB. The tangent drawn at M intersects PA at X and PB at Y. If $\angle APB = \theta$, what is $\angle XOY$?

SSC Phase-XIV (Graduation) 22 Sep 2026, Shift-I

(a) $90^\circ - \frac{\theta}{2}$ (b) $\frac{\theta}{2}$ (c) θ (d) Variable

25 How many diagonals does a regular pentagon have?

SSC Phase-XIV (Graduation) 23 Sep 2026, Shift-I

(a) 5 (b) 7 (c) 10 (d) 15

26 A regular polygon has 20 diagonals. Find the number of its sides.

SSC Phase-XIV (Graduation) 23 Sep 2026, Shift-I

(a) 6 (b) 8 (c) 7 (d) 10

27 The length of a chord of a circle is 6 cm. The angle subtended by the chord at a point on the circumference is 30°. What is the distance of the chord from the centre of the circle?

SSC Phase-XIV (Graduation) 23 Sep 2026, Shift-I

(a) 2 cm (b) $2\sqrt{3}$ cm
(c) 3 cm (d) $3\sqrt{3}$ cm

28 A tangent PQ to a circle is drawn at point P such that $\angle OPQ = 90^\circ$, and a chord PR is drawn such that $\angle RPQ = 30^\circ$. What is the angle subtended by chord PR at the centre O?

SSC Phase-XIV (Graduation) 23 Sep 2026, Shift-I

(a) 30° (b) 60° (c) 90° (d) 120°

29 The length of a common external tangent of two circles is 17 cm and the length of a common internal tangent is 9 cm. Find the product of the radii of the circles.

SSC Phase-XIV (Graduation) 23 Sep 2026, Shift-I

(a) 48 (b) 52 (c) 54 (d) 64

30 If a regular polygon has 90 diagonals, what is the measure of each interior angle?

SSC Phase-XIV (Graduation) 24 Sep 2026, Shift-I

(a) 126° (b) 181° (c) 156° (d) 140°

31 In a circle with centre O, AD is a diameter and AC is a chord. Point B lies on AD such that $OB = 7$ cm and $BC = 9$ cm. If $\angle OBC = 60^\circ$, find the radius of the circle.

SSC Phase-XIV (Graduation) 24 Sep 2026, Shift-I

(a) 16 cm (b) $\sqrt{90}$ cm
(c) 25 cm (d) $\sqrt{67}$ cm

32 In a circle of diameter 34 cm, two parallel chords are drawn on opposite sides of the centre. The length of one chord is 30 cm and the perpendicular distance between the two chords is 23 cm. Find the length of the other chord.

SSC Phase-XIV (Graduation) 24 Sep 2026, Shift-I

(a) 14 cm (b) 16 cm (c) 20 cm (d) 24 cm

33 The length of the direct common tangent of two circles is 26 cm, while the length of their transverse common tangent is 10 cm. Find the product of the radii of the circles.

SSC Phase-XIV (Graduation) 24 Sep 2026, Shift-I

(a) 72 (b) 86 (c) 100 (d) 144

34 Each side of a regular nonagon is 8 cm. Find its perimeter.

SSC Phase-XIV (Graduation) 25 Sep 2026, Shift-I

(a) 72 cm (b) 64 cm (c) 70 cm (d) 80 cm

35 A circular piece of glass is to be fully inscribed inside a decorative triangular frame. The sides of the triangle are 13 cm, 14 cm and 15 cm. To cut the glass accurately, the radius of the incircle has to be calculated.

SSC Phase-XIV (Graduation) 25 Sep 2026, Shift-I

(a) 3.5 cm (b) 4 cm (c) 4.5 cm (d) 5 cm

36 If a polygon has 24 sides, how many diagonals will it have?

SSC Phase-XIV (Graduation) 25 Sep 2026, Shift-I

(a) 252 (b) 262 (c) 272 (d) 282

37 In a circle with centre O, PA and PB are tangents touching the circle at A and B respectively. Point C lies on the major arc AB. If $\angle ACB = 50^\circ$, find $\angle APB$.

SSC Phase-XIV (Graduation) 25 Sep 2026, Shift-I

(a) 80° (b) 100° (c) 120° (d) 160°

38 Suppose a circle inscribed in $\triangle ABC$ touches its sides AB, BC and AC at points D, E and F respectively. If $AB = 12$ cm, $BC = 8$ cm and $AC = 10$ cm, find the lengths of AD, BE and CF.

SSC Phase-XIV (Graduation) 25 Sep 2026, Shift-I

(a) 7 cm, 5 cm, 3 cm (b) 8 cm, 5 cm, 2 cm
(c) 9 cm, 7 cm, 2 cm (d) 10 cm, 8 cm, 2 cm

39 Two circles with radii R and $r (R > r)$ touch each other externally. If the angle between their two direct common tangents is 60°, find the ratio of their radii R: r.

SSC Phase-XIV (Graduation) 25 Sep 2026, Shift-I

(a) 5:1 (b) 3:1 (c) 2:7 (d) 3:7

40 Two chords AB and CD of a circle subtend angles of 40° and 70° respectively at the centre. Find the difference between the angles subtended by these chords at points of the circle lying on their minor arcs.

SSC Phase-XIV (12th) 16 Sep 2026, Shift-II

(a) 10° (b) 15° (c) 20° (d) 30°

41 Two calibration dials of radii 12 cm and 5 cm are mounted on a control panel with their centres 17 cm apart. To check alignment, an engineer draws tangents. Find the lengths of the direct and transverse tangents.

SSC Phase-XIV (12th) 17 Sep 2026, Shift-II

(a) 18.44 cm, 0 (b) 15.49 cm, 0
(c) 12.34 cm, 1 cm (d) 16.76 cm, 14.62 cm

42 In a regular polygon, the ratio of an interior angle to its corresponding exterior angle is 5:1. How many sides does it have?

SSC Phase-XIV (12th) 17 Sep 2026, Shift-II

(a) 12 (b) 9 (c) 7 (d) 15

43 A satellite dish is tilted at an angle of 31°. What is the measure of its complementary angle?

SSC Phase-XIV (12th) 18 Sep 2026, Shift-II

(a) 49° (b) 59° (c) 69° (d) 79°

44 Two chords AB and CD intersect at point P inside a circle. If $\angle APC = 75^\circ$ and the ratio of arc AC : BD is 5:1, find the angle subtended by chord BD at a point on the major arc.

SSC Phase-XIV (12th) 18 Sep 2026, Shift-II

(a) 12.5° (b) 15° (c) 25° (d) 27.5°

45 In a cyclic quadrilateral, two opposite angles are $(2x + 10)^\circ$ and $(3x - 5)^\circ$. Find the larger of these two opposite angles.

SSC Phase-XIV (12th) 19 Sep 2026, Shift-II

(a) 70° (b) 80° (c) 90° (d) 100°

46 In triangle ABC, G is the centroid. If CF, AD and BE are the medians to sides AB, BC and CA respectively, and the area of triangle BGF is 24 cm², find the area of triangle ABG.

SSC Phase-XIV (12th) 21 Sep 2026, Shift-II

(a) 24 cm² (b) 48 cm² (c) 144 cm² (d) 72 cm²

47 A chord AB subtends an angle of 70° at the centre of a circle. Find the angle subtended by the same chord at a point on the major arc of the circle.

SSC Phase-XIV (12th) 21 Sep 2026, Shift-II

(a) 35° (b) 70° (c) 110° (d) 145°

48 Each exterior angle of a regular polygon is 30°. How many sides does the polygon have?

SSC Phase-XIV (12th) 22 Sep 2026, Shift-II

(a) 12 (b) 18 (c) 24 (d) 36

49 A surveillance system uses two circular zones:
Circle C_1 has a radius of 10 m
Circle C_2 has a radius of 6 m
The distance between their centres is 26 m
From a point P outside both circles, two straight tangents are drawn, one to each circle, touching C_1 at point A and C_2 at point B. Let O_1 and O_2 be the

centres of the circles. The tangents PA and PB form two right-angled triangles: $\triangle PO_1A$ and $\triangle PO_2B$. Find the ratio of the lengths $O_1A : O_2B$

SSC Phase-XIV (12th) 22 Sep 2026, Shift-II

(a) 5/3 (b) 8/7 (c) 2/5 (d) 7/3

50 Points C and D lie on the same segment of a circle with chord AB. If $\angle ACB = 55^\circ$, then what is $\angle ADB$?

SSC Phase-XIV (12th) 23 Sep 2026, Shift-II

(a) 45° (b) 55° (c) 65° (d) 110°

51 A chord of a circle subtends an angle of 40° at a point on the circle. Find the angle subtended by the same chord at a point in the opposite segment.

SSC Phase-XIV (12th) 24 Sep 2026, Shift-II

(a) 40° (b) 80° (c) 140° (d) 160°

52 Triangles ABC and PQR are similar in the order ABC - PQR. If $AB = 8$ cm, $BC = 10$ cm, $CA = 12$ cm and $PQ = 12$ cm, then what is the perimeter of triangle PQR?

SSC Phase-XIV (12th) 24 Sep 2026, Shift-II

(a) 36 cm (b) 42 cm (c) 45 cm (d) 54 cm

53 In a circle, two chords AB and CD are equal in length. If chord AB subtends an angle of 35° at the centre, find the angle subtended by chord CD at the centre.

SSC Phase-XIV (12th) 26 Sep 2026, Shift-I

(a) 30° (b) 35° (c) 40° (d) 70°

54 In $\triangle ABC$, a line DE is drawn parallel to BC, meeting AB at D and AC at E. If AD:DB = 2:3 and $BC = 35$ cm, find DE.

SSC Phase-XIV (12th) 26 Sep 2026, Shift-I

(a) 12 cm (b) 14 cm (c) 16 cm (d) 21 cm

55 Two adjacent angles form a linear pair. If one angle is 38°, then the other angle is:

SSC Phase-XIV (Matric) 17 Sep 2026, Shift-III

(a) 138° (b) 142° (c) 146° (d) 38°

56 If two adjacent angles are $(1x+3)^\circ$ and $(2x+15)^\circ$ and they form a linear pair, then the smaller angle is:

SSC Phase-XIV (Matric) 17 Sep 2026, Shift-III

(a) 54° (b) 57° (c) 60° (d) 123°

57 Two adjacent angles form a linear pair. If one angle is 42°, then the other angle is:

SSC Phase-XIV (Matric) 19 Sep 2026, Shift-III

(a) 134° (b) 138° (c) 142° (d) 42°

58 Two complementary angles are such that one angle is 29°. Find the other angle.

SSC Phase-XIV (Matric) 19 Sep 2026, Shift-III

(a) 61° (b) 151° (c) 51° (d) 119°

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Answer Key *SSC official key*

Geometry (Q. 01–58)

01	(c)	02	(b)	03	(a)	04	(a)	05	(c)	06	(c)	07	(b)	08	(a)	09	(d)	10	(c)
11	(a)	12	(b)	13	(d)	14	(a)	15	(a)	16	(a)	17	(b)	18	(c)	19	(c)	20	(c)
21	(a)	22	(c)	23	(c)	24	(a)	25	(a)	26	(b)	27	(d)	28	(b)	29	(b)	30	(c)
31	(d)	32	(b)	33	(d)	34	(a)	35	(b)	36	(a)	37	(a)	38	(a)	39	(b)	40	(b)
41	(b)	42	(a)	43	(b)	44	(a)	45	(d)	46	(b)	47	(a)	48	(a)	49	(a)	50	(b)
51	(c)	52	(c)	53	(b)	54	(b)	55	(b)	56	(b)	57	(b)	58	(a)				

Detailed Explanations रटना बंद, समझना शुरू

Geometry

01 **ANSWER (c)** 72 cm²

SSC Phase-XIV (Graduation) 17 Sep 2026, Shift-I

Rule: Median Triangle Area of the triangle $=\frac{4}{3}\times$ (area of the triangle formed by the medians)

First check: $9^2+12^2=81+144=225=15^2$, which means 9, 12, 15 form a right triangle.

Its area $=\frac{1}{2}\times 9\times 12=54$ cm²

Now multiply by $\frac{4}{3}$: $\frac{4}{3}\times 54=72$ cm²

So the area of $\triangle ABC$ is **72 cm²**.

Examiner's Trap Stopping at 54 is the biggest mistake. That is the area of the median triangle. Don't forget to multiply by $\frac{4}{3}$.

02 **ANSWER (b)** 14 cm

SSC Phase-XIV (Graduation) 17 Sep 2026, Shift-I

Rule: Chord Distance $d=\sqrt{r^2-(\frac{l}{2})^2}$

For the 16 cm chord, half the length is 8, so its distance from the centre $=\sqrt{17^2-8^2}=\sqrt{225}=15$ cm

The chords lie on opposite sides of the centre, so the second chord is $23-15=8$ cm from the centre. Its half length $=\sqrt{17^2-8^2}=15$, and the full length is 30 cm

Difference $=30-16=14$ cm

The correct option is **14 cm**.

03 **ANSWER (a)** 15 cm, 13 cm

SSC Phase-XIV (Graduation) 17 Sep 2026, Shift-I

Formula: Incircle Area $=r\times s=\sqrt{s(s-a)(s-b)(s-c)}$

Tangents drawn from an external point are equal. Let the tangent from A be x. Then $AB=x+8$, $AC=x+6$, $BC=14$, $s=x+14$

$s-BC=x$, $s-AC=8$, $s-AB=6$

Apply Heron's formula: $\sqrt{(x+14)\cdot x\cdot 8\cdot 6}=4(x+14)$

Square both sides:

$48x(x+14)=16(x+14)^2\Rightarrow 3x=x+14\Rightarrow x=7$

So $AB=15$ and $AC=13$ cm, that is **15 cm, 13 cm**.

Short Trick In the exam, check with the options: AB − AC must equal BD − DC = 2. Only (A) 15, 13 has a difference of 2.

04 **ANSWER (a)** 14

SSC Phase-XIV (Graduation) 17 Sep 2026, Shift-I

Formula: Common Tangent External$^2=d^2-(R-r)^2$, Internal$^2=d^2-(R+r)^2$

$d^2-(R-r)^2=81$ and $d^2-(R+r)^2=25$

Subtract the second from the first:

$(R+r)^2-(R-r)^2=56\Rightarrow 4Rr=56\Rightarrow Rr=14$

The product is **14**.

Short Trick Remember the direct formula: $Rr=\frac{L_1^2-L_2^2}{4}$ (L_1 is the external and L_2 the internal tangent)

$=\frac{81-25}{4}=14$

05 **ANSWER (c)** 19.6 cm

SSC Phase-XIV (Graduation) 18 Sep 2026, Shift-I

Formula: External Tangent $L=\sqrt{d^2-(R-r)^2}$

Put $d=20$, $R=10$, $r=6$: $L=\sqrt{400-16}=\sqrt{384}$

$\sqrt{384}=8\sqrt{6}\approx 19.6$ cm

So the answer is **19.6 cm**.

Examiner's Trap A direct (external) tangent is needed here, so $(R-r)$ is used. If you take $(R+r)$ by mistake, you get $\sqrt{144}=12$, which is the internal tangent.

06 **ANSWER (c)** 140°

SSC Phase-XIV (Graduation) 18 Sep 2026, Shift-I

Formula: Interior Angle Each interior angle $=180^\circ-\frac{360^\circ}{n}$

Here n = 9, so the exterior angle $=\frac{360^\circ}{9}=40^\circ$.

Each interior angle $=180^\circ-40^\circ=140^\circ$, the answer is **140°**.

07 **ANSWER (b)** 360

SSC Phase-XIV (Graduation) 18 Sep 2026, Shift-I

Formula: Exterior Angle Number of sides $n = 360^\circ \div$ (each exterior angle)

Each exterior angle $= 180^\circ - 179^\circ = 1^\circ$

$n = \frac{360^\circ}{1^\circ} = 360$

The polygon has **360** sides.

08 ANSWER (a) 8.49 cm

SSC Phase-XIV (Graduation) 18 Sep 2026, Shift-I

Formula: External Tangent For touching circles, $L = \sqrt{d^2 - (R-r)^2} = 2\sqrt{Rr}$

The two gears touch externally, so the distance between the centres $d = 3 + 6 = 9$ cm

$L = \sqrt{81 - 9} = \sqrt{72} = 6\sqrt{2} \approx 8.49$ cm

That makes **8.49 cm** the correct option.

Short Trick When the circles touch each other, directly use $L = 2\sqrt{Rr} = 2\sqrt{18} = 6\sqrt{2} \approx 8.49$. You don't even need to find d.

09 ANSWER (d) 120°

SSC Phase-XIV (Graduation) 18 Sep 2026, Shift-I

Rule: Cyclic Quadrilateral Sum of opposite angles of a cyclic quadrilateral $= 180^\circ$

S and P lie on different sides of chord AB (on different arcs). So A, S, B, P together form a cyclic quadrilateral, and $\angle ASB$ and $\angle APB$ are opposite angles.

$\angle APB = 180^\circ - 60^\circ = 120^\circ$

So **120°**.

Examiner's Trap The 30 km radius is given only to scare you. It plays no part in finding the angle.

10 ANSWER (c) 3

SSC Phase-XIV (Graduation) 18 Sep 2026, Shift-I

Concept: Common Tangents Separate: 4 | Touching externally: 3 | Intersecting: 2 | Touching internally: 1 | One inside the other: 0

When they touch externally, there are 2 direct (external) tangents, and 1 at the point of contact.

Total $= 2 + 1 = 3$, so **3** tangents.

Examiner's Trap The radii 6 and 4 are only there to distract you. The count depends only on how the circles are placed relative to each other.

11 ANSWER (a) 4

SSC Phase-XIV (Graduation) 19 Sep 2026, Shift-I

Rule: BPT (Thales) $DE \parallel BC \Rightarrow \frac{AD}{DB} = \frac{AE}{EC}$

Apply the ratio: $\frac{x}{x-2} = \frac{x+2}{x-1}$

Cross multiply:

$x(x-1) = (x+2)(x-2) \Rightarrow x^2 - x = x^2 - 4 \Rightarrow x = 4$

The value of x is **4**.

Short Trick Put x = 2 and DB becomes 0, so (B) is out right there. Check with x = 4: $\frac{4}{2} = \frac{6}{3}$ ✓

12 ANSWER (b) 17 cm

SSC Phase-XIV (Graduation) 19 Sep 2026, Shift-I

Rule: Chord Distance $d = \sqrt{r^2 - (\frac{l}{2})^2}$

AB = 10, half is 5: distance from the centre

$= \sqrt{13^2 - 5^2} = \sqrt{144} = 12$ cm

CD = 24, half is 12: distance from the centre

$= \sqrt{13^2 - 12^2} = \sqrt{25} = 5$ cm

Both lie on opposite sides of the centre, so the distances add up: $12 + 5 = 17$ cm

The distance between the chords is **17 cm**.

Examiner's Trap If the chords were on the same side, you would get $12 - 5 = 7$ cm. Keep an eye on 'opposite sides'. In the exam, this is exactly what they change.

13 ANSWER (d) 15 cm

SSC Phase-XIV (Graduation) 19 Sep 2026, Shift-I

Rule: Tangent-Secant $XA^2 = XP \cdot XQ$ (from the external point X)

The tangents drawn from X to the two circles are equal: $XA = XB$. This means X is the midpoint of AB and $AB = 2 \cdot XA$

By symmetry, take $XP = YQ = a$:

$XY = a + 8 + a = 17 \Rightarrow a = 4.5$, and $XQ = 4.5 + 8 = 12.5$

$XA^2 = 4.5 \times 12.5 = 56.25 \Rightarrow XA = 7.5$

$AB = 2 \times 7.5 = 15$ cm

The length of tangent AB is **15 cm**.

14 **ANSWER (a)** 12 cm

SSC Phase-XIV (Graduation) 19 Sep 2026, Shift-I

Formula: Tangent Length Length of tangent $=\sqrt{d^2-r^2}$, where d = distance of the point from the centre

Remember, the radius is perpendicular to the tangent at the point of contact. So the centre, the point of contact and P form a right triangle whose hypotenuse $=13$ cm.

Tangent $=\sqrt{13^2-5^2}=\sqrt{169-25}=\sqrt{144}=12$ cm. So the answer is **12 cm**.

Short Trick (5, 12, 13) is a Pythagorean triplet. Once you see hypotenuse 13 and one side 5, write the other side as 12 straight away.

15 **ANSWER (a)** 120°

SSC Phase-XIV (Graduation) 21 Sep 2026, Shift-I

Formula: Interior Angle Each interior angle of a regular n-sided polygon $=\frac{(n-2)\times 180^\circ}{n}$

For a hexagon, $n=6$. Interior angle $=\frac{4\times 180^\circ}{6}=120^\circ$, which gives 120°.

Short Trick Go via the exterior angle, it is quicker: $\frac{360^\circ}{6}=60^\circ$, then interior angle $=180^\circ-60^\circ=120^\circ$.

16 **ANSWER (a)** 10 cm

SSC Phase-XIV (Graduation) 21 Sep 2026, Shift-I

Rule: Perpendicular to Chord The perpendicular from the centre to a chord bisects the chord: $r^2=d^2+\left(\frac{l}{2}\right)^2$

First take half the chord: $\frac{16}{2}=8$ cm. The distance from the centre is given as 6 cm.

$r=\sqrt{8^2+6^2}=\sqrt{64+36}=\sqrt{100}=10$ cm. The radius is **10 cm**.

17 **ANSWER (b)** 40°

SSC Phase-XIV (Graduation) 21 Sep 2026, Shift-I

Rule: Chords Cutting Inside If two chords intersect inside a circle, the angle between them $=\frac{1}{2}$(arc AC + arc BD)

Here $\angle APC=50^\circ$ and arc AC $=60^\circ$.

$50^\circ=\frac{1}{2}(60^\circ+BD)\Rightarrow 60^\circ+BD=100^\circ$

That means arc BD $=40^\circ$, and this is exactly the angle BD subtends at the centre. So the answer is 40°.

Examiner's Trap Many students take the difference of the two arcs and halve it. That rule applies when the lines meet outside the circle (secants). When they cut inside, take half the **sum**.

18 **ANSWER (c)** 60°

SSC Phase-XIV (Graduation) 21 Sep 2026, Shift-I

Rule: Tangent Quadrilateral $\angle ATB+\angle AOB=180^\circ$, because $\angle OAT=\angle OBT=90^\circ$

In quadrilateral OATB, the angles at A and B are 90° each. So the other two angles add up to $360^\circ-180^\circ=180^\circ$.

$\angle ATB=180^\circ-120^\circ=60^\circ$, so it is 60°.

19 **ANSWER (c)** 4 cm

SSC Phase-XIV (Graduation) 21 Sep 2026, Shift-I

Rule: Tangent-Secant From an external point P: $PA^2=PM\cdot PN$

Note this carefully. From P, the tangents to the two circles are PA and PB, and the square of each equals $PM\cdot PN$. So $PA=PB$, which means P is the midpoint of AB.

By symmetry, let $PM=QN=a$. Then $PQ=a+3+a=5\Rightarrow a=1$.
This gives $PM=1$ and $PN=1+3=4$.

$PA^2=1\times 4=4\Rightarrow PA=2$, and $AB=2\times PA=4$ cm. The correct option is **4 cm**.

20 **ANSWER (c)** 162°

SSC Phase-XIV (Graduation) 22 Sep 2026, Shift-I

Formula: Diagonals Number of diagonals $=\frac{n(n-3)}{2}$

$\frac{n(n-3)}{2}=170\Rightarrow n(n-3)=340=20\times 17$, so $n=20$.

Exterior angle $=\frac{360^\circ}{20}=18^\circ$, so interior angle $=180^\circ-18^\circ=162^\circ$.

Short Trick $n(n-3)$ simply means two numbers that differ by 3. Split 340 that way: 20 and 17. There you have n.

21 **ANSWER (a)** 115°

SSC Phase-XIV (Graduation) 22 Sep 2026, Shift-I

Rule: Incentre Angle When the internal bisectors of B and C meet, $\angle BOC = 90^\circ + \frac{\angle A}{2}$

The exterior angle at A is given as 130°. First find the interior angle: $\angle A = 180^\circ - 130^\circ = 50^\circ$.

$\angle BOC = 90^\circ + \frac{50^\circ}{2} = 90^\circ + 25^\circ = 115^\circ$.
So the answer is 115°.

Examiner's Trap The trap here is taking 130° directly as $\angle A$ and getting $90^\circ + 65^\circ = 155^\circ$. Find the interior angle first, then apply the formula.

22 **ANSWER (c)** 18 cm

SSC Phase-XIV (Graduation) 22 Sep 2026, Shift-I

Rule: Distance of a Chord Distance from the centre $d = \sqrt{r^2 - \left(\frac{l}{2}\right)^2}$

The diameter is 30, so $r = 15$ cm. Distance of the 24 cm chord from the centre $= \sqrt{15^2 - 12^2} = \sqrt{81} = 9$ cm.

The chords are on opposite sides of the centre, so the other chord is at a distance from the centre $= 21 - 9 = 12$ cm.

Its half-length $= \sqrt{15^2 - 12^2} = 9$ cm, so the full chord is **18 cm**.

Examiner's Trap Stopping at the half-length 9 and marking option (A). Do not forget to multiply by 2 at the end.

23 **ANSWER (c)** 100

SSC Phase-XIV (Graduation) 22 Sep 2026, Shift-I

Formula: Common Tangents $DCT^2 = d^2 - (R - r)^2$ and $TCT^2 = d^2 - (R + r)^2$, which give $Rr = \frac{DCT^2 - TCT^2}{4}$

Subtract the two equations:
$DCT^2 - TCT^2 = (R + r)^2 - (R - r)^2 = 4Rr$. The d cancels out on its own.

$4Rr = 25^2 - 15^2 = 625 - 225 = 400 \Rightarrow Rr = 100$. The product is **100**.

Short Trick Work out $25^2 - 15^2$ as $(25 + 15)(25 - 15) = 40 \times 10 = 400$, then divide by 4.

24 **ANSWER (a)** $90^\circ - \frac{\theta}{2}$

SSC Phase-XIV (Graduation) 22 Sep 2026, Shift-I

Rule: Tangent Quadrilateral $\angle AOB = 180^\circ - \angle APB$

So here $\angle AOB = 180^\circ - \theta$.

Two tangents XA and XM come out of X, so OX bisects $\angle AOM$. In the same way, OY bisects $\angle MOB$.

$\angle XOY = \frac{1}{2}\angle AOM + \frac{1}{2}\angle MOB = \frac{1}{2}\angle AOB = \frac{1}{2}(180^\circ - \theta) = 90^\circ - \frac{\theta}{2}$
That makes (a) $90^\circ - \frac{\theta}{2}$ correct.

Examiner's Trap Move M anywhere you like. X and Y will shift, but $\angle XOY$ stays the same. The 'Variable' option has been put there on purpose.

25 **ANSWER (a)** 5

SSC Phase-XIV (Graduation) 23 Sep 2026, Shift-I

Formula: Diagonals Number of diagonals $= \frac{n(n-3)}{2}$

For a pentagon, $n = 5$, so diagonals $= \frac{5 \times 2}{2} =$ **5**.

26 **ANSWER (b)** 8

SSC Phase-XIV (Graduation) 23 Sep 2026, Shift-I

Formula: Diagonals Number of diagonals $= \frac{n(n-3)}{2}$

$\frac{n(n-3)}{2} = 20 \Rightarrow n(n-3) = 40$

Now write 40 as two factors that differ by 3: $40 = 8 \times 5$. So the polygon has **8** sides.

27 **ANSWER (d)** $3\sqrt{3}$ cm

SSC Phase-XIV (Graduation) 23 Sep 2026, Shift-I

Rule: Central Angle The angle at the centre is twice the angle at the circumference

The angle at the circumference is 30°, so at the centre $\angle AOB = 60^\circ$.

In $\triangle OAB$, $OA = OB$ and the included angle is 60°, which means the triangle is equilateral. So $r = AB = 6$ cm.

The distance of the chord from the centre is the height of this equilateral triangle: $\frac{\sqrt{3}}{2} \times 6 = 3\sqrt{3}$ cm.
The correct option is $3\sqrt{3}$ **cm**.

28 **ANSWER (b)** 60°

SSC Phase-XIV (Graduation) 23 Sep 2026, Shift-I

Rule: Tangent-Chord Angle Angle of the chord at the centre = twice the angle between the tangent and the chord

First find $\angle OPR$: $90^\circ - 30^\circ = 60^\circ$.

In $\triangle OPR$, $OP = OR$, so $\angle ORP = 60^\circ$ too. What is left is $\angle POR = 180^\circ - 120^\circ = 60^\circ$.

Short Trick Direct method: angle at the centre $= 2 \times 30^\circ = 60^\circ$. A two-second job.

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29 ANSWER (b) 52

SSC Phase-XIV (Graduation) 23 Sep 2026, Shift-I

Formula: Product of Radii $Rr = \frac{DCT^2 - TCT^2}{4}$

Where does this come from? $DCT^2 = d^2 - (R - r)^2$ and $TCT^2 = d^2 - (R + r)^2$. Subtract them and you are left with $4Rr = DCT^2 - TCT^2$.

$4Rr = 17^2 - 9^2 = 289 - 81 = 208 \Rightarrow Rr = 52$

So the product comes to **52**.

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30 ANSWER (c) 156°

SSC Phase-XIV (Graduation) 24 Sep 2026, Shift-I

Formula: Diagonals Number of diagonals $= \frac{n(n-3)}{2}$

$n(n-3) = 180 = 15 \times 12$, so $n = 15$.

Exterior angle $= \frac{360^\circ}{15} = 24^\circ$, and interior angle $= 180^\circ - 24^\circ = 156^\circ$. Answer: 156°.

Short Trick An interior angle of a regular polygon is always less than 180°, so strike off the 181° option the moment you read it.

---

31 ANSWER (d) $\sqrt{67}$ cm

SSC Phase-XIV (Graduation) 24 Sep 2026, Shift-I

Formula: Cosine Rule

$OC^2 = OB^2 + BC^2 - 2 \cdot OB \cdot BC\cos \angle OBC$

C lies on the circle, so $OC = r$. In $\triangle OBC$, $OB = 7$, $BC = 9$ and $\angle OBC = 60^\circ$.

$r^2 = 49 + 81 - 2 \times 7 \times 9 \times \frac{1}{2} = 130 - 63 = 67$

So $r = \sqrt{67}$ cm, the option $\sqrt{67}$ **cm**.

Examiner's Trap If you take $\cos 120^\circ$ instead of $\cos 60^\circ$, you will get $r^2 = 193$. The angle is at B and it is 60°, so use that.

---

32 ANSWER (b) 16 cm

SSC Phase-XIV (Graduation) 24 Sep 2026, Shift-I

Rule: Distance of a Chord $d = \sqrt{r^2 - \left(\frac{l}{2}\right)^2}$

$r = 17$ cm. Distance of the 30 cm chord from the centre $= \sqrt{17^2 - 15^2} = \sqrt{64} = 8$ cm.

The other chord is on the opposite side of the centre, so its distance $= 23 - 8 = 15$ cm.

Its half-length $= \sqrt{17^2 - 15^2} = 8$, and the full length is **16 cm**.

Short Trick Keep an eye on the (8, 15, 17) triplet. In the first chord, half-length was 15 and distance was 8. The second chord is at distance 15, so its half-length is 8. The two values just swapped places.

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33 ANSWER (d) 144

SSC Phase-XIV (Graduation) 24 Sep 2026, Shift-I

Formula: Product of Radii $Rr = \frac{DCT^2 - TCT^2}{4}$

$4Rr = 26^2 - 10^2 = 676 - 100 = 576$

$Rr = \frac{576}{4} = 144$. That gives **144**.

---

34 ANSWER (a) 72 cm

SSC Phase-XIV (Graduation) 25 Sep 2026, Shift-I

A nonagon has 9 equal sides.

Perimeter $= 9 \times 8 = 72$ cm, so the answer is **72 cm**.

Examiner's Trap 'Nona' means 9, not 8. Option (B), $8 \times 8 = 64$, is there to catch exactly this mistake.

---

35 ANSWER (b) 4 cm

SSC Phase-XIV (Graduation) 25 Sep 2026, Shift-I

Formula: Inradius $r = \frac{\Delta}{s}$, where $\Delta = \sqrt{s(s-a)(s-b)(s-c)}$

$s = \frac{13 + 14 + 15}{2} = 21$

$\Delta = \sqrt{21 \times 8 \times 7 \times 6} = \sqrt{7056} = 84$ cm^2

$r = \frac{84}{21} = 4$ cm. The inradius is **4 cm**.

Short Trick Memorise that the 13-14-15 triangle has area 84. It comes up again and again in SSC.

---

36 ANSWER (a) 252

SSC Phase-XIV (Graduation) 25 Sep 2026, Shift-I

Formula: Diagonals Number of diagonals $=\frac{n(n-3)}{2}$

Put $n=24$: $\frac{24\times21}{2}=12\times21=252$. So it has **252** diagonals.

37 ANSWER (a) 80°

SSC Phase-XIV (Graduation) 25 Sep 2026, Shift-I

Rule: Tangent Quadrilateral $\angle APB=180^\circ-\angle AOB$

C is on the major arc, so the central angle of minor arc AB is $\angle AOB=2\times50^\circ=100^\circ$.

Since $\angle OAP=\angle OBP=90^\circ$, we get
$\angle APB=180^\circ-100^\circ=80^\circ$.
The correct option is 80°.

Short Trick In one line:
$\angle APB=180^\circ-2\angle ACB=180^\circ-100^\circ=80^\circ$.

38 ANSWER (a) 7 cm, 5 cm, 3 cm

SSC Phase-XIV (Graduation) 25 Sep 2026, Shift-I

Rule: Incircle Tangents Tangent length from a vertex $=s-$ (opposite side)

$s=\frac{12+8+10}{2}=15$
$AD=s-BC=15-8=7$
$BE=s-AC=15-10=5$
$CF=s-AB=15-12=3$

In order, the three lengths are **7 cm, 5 cm, 3 cm**.

Short Trick Run a quick check:
$AD+BD=7+5=12=AB$. Only option (A) passes this check.

39 ANSWER (b) 3:1

SSC Phase-XIV (Graduation) 25 Sep 2026, Shift-I

Rule: Direct Tangent Angle If the angle between the two direct tangents is 2θ, then $\sin\theta=\frac{R-r}{R+r}$

$2\theta=60^\circ\Rightarrow\theta=30^\circ$, so $\frac{R-r}{R+r}=\sin30^\circ=\frac{1}{2}$

$2R-2r=R+r\Rightarrow R=3r$, so R : r = **3:1**.

Short Trick $R>r$ is given, so the options 2:7 and 3:7 are out at first glance.

40 ANSWER (b) 15°

SSC Phase-XIV (12th) 16 Sep 2026, Shift-II

Rule: Angle on Minor Arc A chord subtending θ at the centre subtends $180^\circ-\frac{\theta}{2}$ at a point on the minor arc

For AB: $180^\circ-20^\circ=160^\circ$
For CD: $180^\circ-35^\circ=145^\circ$

Difference $=160^\circ-145^\circ=15^\circ$, so the answer is 15°.

Short Trick Directly, difference $=\frac{70^\circ-40^\circ}{2}=15^\circ$. Minor arc or major arc, the difference comes out the same.

41 ANSWER (b) 15.49 cm, 0

SSC Phase-XIV (12th) 17 Sep 2026, Shift-II

Formula: Common Tangents $DCT=\sqrt{d^2-(R-r)^2}$, $TCT=\sqrt{d^2-(R+r)^2}$

Direct: $\sqrt{17^2-7^2}=\sqrt{289-49}=\sqrt{240}\approx15.49$ cm

Transverse: $\sqrt{17^2-17^2}=0$. Here $d=R+r$, which means the two circles touch externally.
So the answer is **15.49 cm, 0**.

Short Trick The moment you see $d=12+5=17$, you know the circles touch, so TCT = 0. That leaves A or B, and since $\sqrt{240}<16$, it is B.

42 ANSWER (a) 12

SSC Phase-XIV (12th) 17 Sep 2026, Shift-II

Formula: Number of Sides $n=\frac{360^\circ}{E}$, where E = exterior angle

Interior angle + exterior angle $=180^\circ$ and the ratio is 5 : 1. So the exterior angle $=\frac{180^\circ}{6}=30^\circ$.

$n=\frac{360^\circ}{30^\circ}=12$. The polygon has **12** sides.

Short Trick If the ratio is k : 1, use $n=2(k+1)$ directly. Here $n=2\times6=12$.

43 ANSWER (b) 59°

SSC Phase-XIV (12th) 18 Sep 2026, Shift-II

Concept: Complementary Angle Two angles whose sum is 90° are called complementary

Complementary angle $=90^\circ-31^\circ=59^\circ$.

Examiner's Trap Do not mix up complementary (90°) and supplementary (180°). Take the supplement by mistake and you will get 149°.

44 ANSWER (a) 12.5°

SSC Phase-XIV (12th) 18 Sep 2026, Shift-II

Rule: Chords Cutting Inside $\angle APC = \frac{1}{2}(\text{arc AC} + \text{arc BD})$

$75^\circ = \frac{1}{2}(AC + BD) \Rightarrow AC + BD = 150^\circ$

Divide this in the ratio 5 : 1: arc AC $= 125^\circ$ and arc BD $= 25^\circ$.

At a point on the major arc, the angle of BD is half the arc: $\frac{25^\circ}{2} = 12.5^\circ$. Answer: 12.5°.

Examiner's Trap Writing down the arc BD measure 25° as the answer. Remember, the angle at the circumference is half the arc.

45 ANSWER (d) 100°

SSC Phase-XIV (12th) 19 Sep 2026, Shift-II

Rule: Cyclic Quadrilateral Sum of opposite angles $= 180^\circ$

$(2x + 10) + (3x - 5) = 180 \Rightarrow 5x + 5 = 180 \Rightarrow x = 35$

The two angles are $2(35) + 10 = 80^\circ$ and $3(35) - 5 = 100^\circ$. The larger one is 100°.

Examiner's Trap 80° is also among the options. The question asks for the 'larger angle', so keep that in mind.

46 ANSWER (b) 48 cm²

SSC Phase-XIV (12th) 21 Sep 2026, Shift-II

Rule: Centroid and Area The three medians divide a triangle into 6 parts of equal area

$\triangle BGF$ is one of these 6 parts, so $[ABC] = 6 \times 24 = 144$ cm².

$\triangle ABG$ contains two parts, $\triangle AGF$ and $\triangle BGF$. So $[ABG] = 2 \times 24 = 48$ cm², which is **48 cm²**.

47 ANSWER (a) 35°

SSC Phase-XIV (12th) 21 Sep 2026, Shift-II

Rule: Central Angle Angle on the major arc = half the central angle

Angle $= \frac{70^\circ}{2} = 35^\circ$. Simply 35°.

Examiner's Trap 145° is the angle at a point on the minor arc ($180^\circ - 35^\circ$). The question is about the major arc, so that option is wrong.

48 ANSWER (a) 12

SSC Phase-XIV (12th) 22 Sep 2026, Shift-II

Formula: Exterior Angle All the exterior angles of any regular polygon add up to 360°. So the number of sides is $n = \frac{360^\circ}{e}$, where e is one exterior angle.

Here $e = 30^\circ$, so $n = \frac{360^\circ}{30^\circ} = 12$.

So the polygon has **12** sides.

Examiner's Trap 30° is the exterior angle, not the interior one. The interior angle would be $180^\circ - 30^\circ = 150^\circ$. Don't end up doing $\frac{360}{150}$ by mistake.

49 ANSWER (a) 5/3

SSC Phase-XIV (12th) 22 Sep 2026, Shift-II

Concept: Point of Contact The line from the centre to the point of contact is always a radius, and it is perpendicular to the tangent.

A is the point of contact on circle C_1, so O_1A is simply the radius of C_1, that is 10 m.
In the same way, B lies on C_2, so O_2B = 6 m.

Now the ratio: $O_1A : O_2B = 10 : 6 = 5 : 3$, which means $\frac{5}{3}$.
So the answer is **5/3**.

Examiner's Trap The 26 m distance and the whole story about point P are only there to confuse you. The two lengths asked are just the radii.

50 ANSWER (b) 55°

SSC Phase-XIV (12th) 23 Sep 2026, Shift-II

Theorem: Same Segment All the angles made by the same chord in the same segment are equal.

C and D are both on the same side of chord AB. So straight away $\angle ADB = \angle ACB = 55^\circ$, which gives **55°**.

Examiner's Trap Many students mark the 110° option. That would be the angle at the centre ($2 \times 55^\circ$). Here D is not the centre, it is a point on the circle.

51 ANSWER (c) 140°

SSC Phase-XIV (12th) 24 Sep 2026, Shift-II

Theorem: Cyclic Quad Opposite angles of a cyclic quadrilateral add up to 180°.

Take both ends of the chord and one point from each segment. They form a cyclic quadrilateral, and the two angles asked are opposite angles in it.

So the angle in the opposite segment $= 180^\circ - 40^\circ = 140^\circ$. The correct option is **140°**.

52 ANSWER (c) 45 cm

SSC Phase-XIV (12th) 24 Sep 2026, Shift-II

Rule: Similar Triangles In similar triangles, the ratio of perimeters is the same as the ratio of corresponding sides.

AB and PQ are corresponding sides, so the ratio $= \frac{PQ}{AB} = \frac{12}{8} = \frac{3}{2}$.

First find the perimeter of $\triangle ABC$: $8 + 10 + 12 = 30$ cm.

Now the perimeter of $\triangle PQR = 30 \times \frac{3}{2} = 45$ cm.

Answer: **45 cm**.

53 ANSWER (b) 35°

SSC Phase-XIV (12th) 26 Sep 2026, Shift-I

Theorem: Equal Chords In the same circle, equal chords subtend equal angles at the centre.

AB = CD is given, so CD makes the same angle at the centre as AB, that is **35°**.

54 ANSWER (b) 14 cm

SSC Phase-XIV (12th) 26 Sep 2026, Shift-I

Theorem: BPT / Similarity If $DE \| BC$, then $\triangle ADE \sim \triangle ABC$, and $\frac{DE}{BC} = \frac{AD}{AB}$

AD : DB = 2 : 3. The whole side AB = 2 + 3 = 5 parts, so AD : AB = 2 : 5.

$DE = \frac{2}{5} \times 35 = 14$ cm, so DE is **14 cm**.

Examiner's Trap If you rush and do $\frac{2}{3} \times 35$, you get a wrong answer. DE is compared with the whole side AB, not with DB.

55 ANSWER (b) 142°

SSC Phase-XIV (Matric) 17 Sep 2026, Shift-III

Concept: Linear Pair The two angles of a linear pair together make 180°.

Just subtract: $180^\circ - 38^\circ = 142^\circ$. The other angle is **142°**.

56 ANSWER (b) 57°

SSC Phase-XIV (Matric) 17 Sep 2026, Shift-III

Concept: Linear Pair In a linear pair, the sum of the two angles is 180°

Add both angles and set the sum equal to 180:
$(x + 3) + (2x + 15) = 180$
$3x + 18 = 180, 3x = 162, x = 54$

Now find the angles: $54 + 3 = 57^\circ$ and $2 \times 54 + 15 = 123^\circ$. Check it too: $57 + 123 = 180$, which is correct.

The smaller of the two is **57°**.

Examiner's Trap 54 is only the value of x, not an angle. It has been placed in option (A) on purpose, so don't stop there.

57 ANSWER (b) 138°

SSC Phase-XIV (Matric) 19 Sep 2026, Shift-III

Concept: Linear Pair Add the angles of a linear pair and you get 180°

Other angle $= 180^\circ - 42^\circ = 138^\circ$. So the answer is **138°**.

58 ANSWER (a) 61°

SSC Phase-XIV (Matric) 19 Sep 2026, Shift-III

Concept: Complementary The sum of complementary angles is 90°.

$90^\circ - 29^\circ = 61^\circ$, so the other angle is **61°**.

Examiner's Trap The 151° option comes from supplementary angles (sum 180°). Remember, complementary = 90 and supplementary = 180.

21 CHAPTER
Mensuration (2D)

Questions *58 questions · 23 shifts*

Mensuration (2D)

Directions (Q. 01–58): *Choose the correct answer from the four given options.*

01 The side of a regular hexagon is equal to the side of a square. If the perimeter of the square is 24 cm, find the perimeter of the hexagon.

SSC Phase-XIV (Graduation) 17 Sep 2026, Shift-I

(a) 26 cm (b) 16 cm (c) 46 cm (d) 36 cm

02 In a circle of radius 21 cm, an arc subtends an angle of 120 degrees at the centre. Find the length of the arc. (Take $\pi = \frac{22}{7}$)

SSC Phase-XIV (Graduation) 17 Sep 2026, Shift-I

(a) 22 cm (b) 14 cm (c) 44 cm (d) 28 cm

03 A giant rotating clock ride completes a swing of $\frac{5\pi}{2}$ radians. Each swing extends 40 metres along its arc. What is the radius of the circular path?

SSC Phase-XIV (Graduation) 18 Sep 2026, Shift-I

(a) 16 (b) 14
(c) $40 \div \left(\frac{5\pi}{2}\right)$ (d) $40 + (2.5\pi)$

04 If a circular wire is bent to form a square, and the radius of the circle is 14 cm, what will be the side of the square?

SSC Phase-XIV (Graduation) 18 Sep 2026, Shift-I

(a) 14 (b) 22 (c) 44 (d) 28

05 The area of a square tile is 72 cm². What is the length of each side in simplest surd form?

SSC Phase-XIV (Graduation) 18 Sep 2026, Shift-I

(a) $6\sqrt{2}$ cm (b) $\sqrt{72}$ cm
(c) 12 cm (d) 4/3 cm

06 If the side of a regular hexagon is doubled, what will be the effect on its area?

SSC Phase-XIV (Graduation) 19 Sep 2026, Shift-I

(a) Increases 2 times (b) Increases 3 times
(c) Increases 4 times (d) Increases 6 times

07 The area of a sector of a circle with radius 28 cm is 308 sq cm. Find the central angle of the sector. (Use $\pi = \frac{22}{7}$)

SSC Phase-XIV (Graduation) 19 Sep 2026, Shift-I

(a) 75° (b) 45° (c) 60° (d) 90°

08 The area of a regular hexagon inscribed in a circle is $200\sqrt{3}$ cm². Find the radius of the circle.

SSC Phase-XIV (Graduation) 21 Sep 2026, Shift-I

(a) 10 (b) 11.54 (c) 14 (d) 16

09 The radius of a circular track is 28 m. What distance is covered in 2 complete rounds?

SSC Phase-XIV (Graduation) 21 Sep 2026, Shift-I

(a) 176 m (b) 346 m (c) 352 m (d) 564 m

10 The area of a sector of a circle with radius 21 cm is 231 sq cm. Find the degree measure of the corresponding central angle. (Use $\pi = \frac{22}{7}$)

SSC Phase-XIV (Graduation) 22 Sep 2026, Shift-I

(a) 90° (b) 30° (c) 60° (d) 45°

11 Find the area of a quadrant of a circle with

radius 7 cm.

SSC Phase-XIV (Graduation) 23 Sep 2026, Shift-I

(a) 38.5 cm² (b) 114 cm²
(c) 14 cm² (d) 144 cm²

12 A circular park has a radius of 8 cm, and a special garden area is designed as a sector with an area of 32π cm². Find the length of the curved boundary (arc) of this garden sector.

SSC Phase-XIV (Graduation) 23 Sep 2026, Shift-I

(a) 4π cm (b) 6π cm (c) 8π cm (d) 10π cm

13 In a circle of radius 42 cm, an arc subtends an angle of 15 degrees at the centre. Find the length of the arc. (Take $\pi = \frac{22}{7}$)

SSC Phase-XIV (Graduation) 24 Sep 2026, Shift-I

(a) 33 cm (b) 11 cm (c) 22 cm (d) 44 cm

14 Tangents PT and PS are drawn from an external point P to a circle of radius 5 cm. If the distance of P from the centre O is 13 cm, find the area of quadrilateral PTOS.

SSC Phase-XIV (Graduation) 24 Sep 2026, Shift-I

(a) 30 cm² (b) 45 cm² (c) 60 cm² (d) 65 cm²

15 Find the radius of the circle whose circumference is 31.4 cm.

SSC Phase-XIV (Graduation) 25 Sep 2026, Shift-I

(a) 5 cm (b) 6 cm (c) 4 cm (d) 7 cm

16 A sector of a circle subtends an angle of $\frac{\pi}{3}$ radians at the centre. If the radius of the circle is 6 cm, what is the length of the arc?

SSC Phase-XIV (Graduation) 25 Sep 2026, Shift-I

(a) $\frac{2\pi}{7}$ (b) $\frac{2\pi}{3}$ m (c) 42π cm (d) 2π cm

17 Find the length of the arc intercepted by a central angle of 90° in a circle of radius 14 cm. (Use $\pi = \frac{22}{7}$)

SSC Phase-XIV (12th) 17 Sep 2026, Shift-II

(a) 22 cm (b) 23 cm (c) 24 cm (d) 25 cm

18 If the ratio of the height and the base of a parallelogram is 14:9 respectively, and its area is 1134 cm², find the difference between the height and the base of the parallelogram.

SSC Phase-XIV (12th) 17 Sep 2026, Shift-II

(a) 12 cm (b) 28 cm (c) 15 cm (d) 26 cm

19 Find the area of a triangle with sides 7 cm, 9 cm and 12 cm.

SSC Phase-XIV (12th) 17 Sep 2026, Shift-II

(a) $10\sqrt{5}$ cm² (b) $16\sqrt{5}$ cm²
(c) $14\sqrt{5}$ cm² (d) $18\sqrt{5}$ cm²

20 A plot of land is in the shape of a quadrilateral, consisting of a rectangle and a right-angled triangle attached to one shorter side of the rectangle. The rectangle is 20 m long and 12 m wide. The right-angled triangle has a base of 12 m (same as the width of the rectangle) and a height of 9 m.
What is the total area of this quadrilateral-shaped land?

SSC Phase-XIV (12th) 21 Sep 2026, Shift-II

(a) 294 m² (b) 376 m² (c) 456 m² (d) 567 m²

21 In a trapezium, the parallel sides are 20 cm and 10 cm long. If the non-parallel sides are equal and the area is 180 cm², what is the distance between the parallel sides?

SSC Phase-XIV (12th) 21 Sep 2026, Shift-II

(a) 15 cm (b) 12 cm (c) 18 cm (d) 10 cm

22 If the radius of a circle is 10.5 cm, what is the length of the arc formed by a central angle of 60°? (Use $\pi = \frac{22}{7}$)

SSC Phase-XIV (12th) 22 Sep 2026, Shift-II

(a) 11 cm (b) 13 cm (c) 11.5 cm (d) 12 cm

23 The length and breadth of a rectangle are 'x' cm and 16 cm respectively. If the perimeter of the rectangle is 80 cm, find the area of the rectangle.

SSC Phase-XIV (12th) 22 Sep 2026, Shift-II

(a) 254 cm² (b) 144 cm² (c) 294 cm² (d) 384 cm²

24 Find the area of a triangle whose sides are 13 cm, 14 cm and 15 cm.

SSC Phase-XIV (12th) 22 Sep 2026, Shift-II

(a) 48 cm² (b) 84 cm² (c) 96 cm² (d) 72 cm²

25 The sum of the length and breadth of a rectangle is 28 cm, and the sum of the perimeters of

the rectangle and a square is 96 cm. Find the diagonal of the square.

SSC Phase-XIV (12th) 24 Sep 2026, Shift-II

(a) $15\sqrt{2}$ cm (b) $11\sqrt{2}$ cm
(c) $10\sqrt{2}$ cm (d) $12\sqrt{2}$ cm

26 The diagonals of a rhombus are 16 cm and 30 cm. Use the half-diagonals to find its side and perimeter. What is the perimeter?

SSC Phase-XIV (12th) 24 Sep 2026, Shift-II

(a) 60 cm (b) 64 cm (c) 68 cm (d) 72 cm

27 In a parallelogram, the adjacent sides are 12 cm and 8 cm long. If the distance between the longer sides is 6 cm, what is the distance between the shorter sides?

SSC Phase-XIV (12th) 25 Sep 2026, Shift-II

(a) 7 cm (b) 9 cm (c) 13 cm (d) 11 cm

28 The radii of two circles are 8 cm and 7 cm, and the distance between their centres is 25 cm. Find the length of a transverse common tangent.

SSC Phase-XIV (12th) 25 Sep 2026, Shift-II

(a) 15 cm (b) 18 cm (c) 20 cm (d) 24 cm

29 The sides of a triangular field are 20 m, 21 m and 29 m. After identifying the triangle as a right-angled triangle, find the length of the altitude drawn to the hypotenuse.

SSC Phase-XIV (12th) 25 Sep 2026, Shift-II

(a) $\frac{210}{29}$ m (b) $\frac{420}{29}$ m (c) $\frac{400}{29}$ m (d) $\frac{441}{29}$ m

30 A regular hexagonal tile has a side of 10 cm. Using the standard formula for a regular hexagon, find its exact area.

SSC Phase-XIV (12th) 25 Sep 2026, Shift-II

(a) $100\sqrt{3}$ cm² (b) $150\sqrt{3}$ cm²
(c) $200\sqrt{3}$ cm² (d) $300\sqrt{3}$ cm²

31 The parallel sides of a trapezium are 18 cm and 32 cm. The distance between the parallel sides is 10 cm. What is the area of the trapezium?

SSC Phase-XIV (12th) 26 Sep 2026, Shift-I

(a) 220 cm² (b) 240 cm² (c) 250 cm² (d) 300 cm²

32 The diagonals of a rhombus are in the ratio 11 : 60 and its perimeter is 244 cm. What is its area?

SSC Phase-XIV (12th) 26 Sep 2026, Shift-I

(a) 1200 cm² (b) 1320 cm²
(c) 1440 cm² (d) 1560 cm²

33 The area of a square courtyard is 2304 m². A path 2 m wide is built all around it on the outside. What is the length of the side of the outer square?

SSC Phase-XIV (Matric) 16 Sep 2026, Shift-III

(a) 48 m (b) 50 m (c) 52 m (d) 54 m

34 If the diameter of a circle is decreased by 20%, by what percentage will its area decrease?

SSC Phase-XIV (Matric) 16 Sep 2026, Shift-III

(a) 20% (b) 32% (c) 36% (d) 40%

35 A square and a rectangle have equal perimeters. The length of the rectangle is 14 cm and its breadth is 10 cm. Find the area of the square.

SSC Phase-XIV (Matric) 16 Sep 2026, Shift-III

(a) 138 cm² (b) 140 cm² (c) 144 cm² (d) 150 cm²

36 The length of a rectangular field is $33\frac{1}{3}$% more than its breadth. If the cost of grassing the field at Rs15 per square metre is Rs18,000, what will be the cost of fencing the boundary of the field at Rs24 per metre?

SSC Phase-XIV (Matric) 16 Sep 2026, Shift-III

(a) Rs 3250 (b) Rs 4000 (c) Rs 3360 (d) Rs 4350

37 A 2 cm × 2 cm square is cut from one corner of a 6 cm × 6 cm square. Find the perimeter of the resulting figure.

SSC Phase-XIV (Matric) 17 Sep 2026, Shift-III

(a) 24 cm (b) 20 cm (c) 18 cm (d) 14 cm

38 A square garden has a side of 36 metres. A square pond of area 196 square metres is dug inside it. What is the difference between the side lengths of the garden and the pond?

SSC Phase-XIV (Matric) 18 Sep 2026, Shift-III

(a) 20 m (b) 22 m (c) 24 m (d) 26 m

39 A wire 176 cm long is bent to form a circle. What is the radius of the circle? (Use $\pi = \frac{22}{7}$)

SSC Phase-XIV (Matric) 18 Sep 2026, Shift-III

(a) 14 cm (b) 21 cm (c) 28 cm (d) 35 cm

40 A copper wire is bent in the form of a circle of radius 21 cm. If it is bent into a rectangle whose sides are in the ratio 6 : 5, find the length of the longer side of the rectangle. (Take $\pi = \frac{22}{7}$)

SSC Phase-XIV (Matric) 18 Sep 2026, Shift-III

(a) 28 cm (b) 30 cm (c) 32 cm (d) 36 cm

41 A running track consists of a central rectangle measuring 100 metres by 50 metres, with a semicircle attached to each of its two shorter sides. What is the total area enclosed by the track? (Use $\pi = 3.14$)

SSC Phase-XIV (Matric) 19 Sep 2026, Shift-III

(a) 6962.5 m² (b) 7332.5 m²
(c) 5242.5 m² (d) 8232.5 m²

42 The side of a square field is increased from 24 m to 30 m. By how many m² does its area increase?

SSC Phase-XIV (Matric) 21 Sep 2026, Shift-III

(a) 324 m² (b) 336 m² (c) 348 m² (d) 360 m²

43 A wheel of diameter 70 cm rolls along a road. How many complete revolutions will it make in covering a distance of 44 m? (Take $\pi = \frac{22}{7}$)

SSC Phase-XIV (Matric) 21 Sep 2026, Shift-III

(a) 18 (b) 20 (c) 22 (d) 25

44 The perimeters of five squares are 24 cm, 32 cm, 40 cm, 76 cm and 80 cm respectively. Find the perimeter of a sixth square whose area is equal to the sum of the areas of these five squares.

SSC Phase-XIV (Matric) 21 Sep 2026, Shift-III

(a) 124 cm (b) 135 cm (c) 128 cm (d) 138 cm

45 If the radius of a circle is reduced by 10%, by what percentage does its area decrease?

SSC Phase-XIV (Matric) 21 Sep 2026, Shift-III

(a) 18% (b) 21% (c) 20% (d) 19%

46 What is the circumference of a circle whose diameter is 35 cm? (Use $\pi = \frac{22}{7}$)

SSC Phase-XIV (Matric) 22 Sep 2026, Shift-III

(a) 100 cm (b) 105 cm (c) 110 cm (d) 115 cm

47 A wire is bent into the shape of an equilateral triangle of area $16\sqrt{3}$ cm². If the same wire is bent into the form of a square, what will be the area of the square?

SSC Phase-XIV (Matric) 22 Sep 2026, Shift-III

(a) 36 cm² (b) 28 cm² (c) 24 cm² (d) 30 cm²

48 A square S_1 has an area of 256 square units. A second square S_2 is formed by joining the midpoints of the sides of S_1. A third square S_3 is formed by joining the midpoints of S_2, and so on. Find the perimeter of the fifth square (S_5) in the sequence.

SSC Phase-XIV (Matric) 22 Sep 2026, Shift-III

(a) 12 units (b) 14 units
(c) 16 units (d) 18 units

49 The perimeter of a square park is 200 m. A square flower bed of area 625 m² is made inside it. What is the difference between the areas of the park and the flower bed?

SSC Phase-XIV (Matric) 23 Sep 2026, Shift-III

(a) 1875 m² (b) 1900 m²
(c) 1925 m² (d) 2000 m²

50 A photo frame measures 30 centimetres by 20 centimetres. Inside it, a white border mat takes up 2 centimetres on all sides before the photo begins. What is the perimeter of the inner photo?

SSC Phase-XIV (Matric) 23 Sep 2026, Shift-III

(a) 94 cm (b) 64 cm (c) 74 cm (d) 84 cm

51 A 4 cm x 4 cm square is cut from the top-right corner of a 12 cm x 12 cm square. What is the perimeter of the inverted L-shaped figure?

SSC Phase-XIV (Matric) 23 Sep 2026, Shift-III

(a) 40 cm (b) 48 cm (c) 41 cm (d) 38 cm

52 The radius of a circular field is 21 m. What is the cost of fencing it all around at the rate of Rs4/m? (Use $\pi = \frac{22}{7}$)

SSC Phase-XIV (Matric) 24 Sep 2026, Shift-III

(a) Rs484 (b) Rs528 (c) Rs544 (d) Rs572

53 A 4 cm x 2 cm rectangle is cut from one corner of a 12 cm x 8 cm rectangle. What is the perimeter of the resulting figure?

SSC Phase-XIV (Matric) 24 Sep 2026, Shift-III

(a) 40 cm (b) 30 cm (c) 50 cm (d) 20 cm

54 A 5 cm x 5 cm square is cut from one corner of a 20 cm x 15 cm rectangle. Find the perimeter of the resulting figure.

SSC Phase-XIV (Matric) 24 Sep 2026, Shift-III

(a) 40 cm (b) 60 cm (c) 70 cm (d) 50 cm

55 A square floor is made using 1296 tiles of equal size. If each tile is a square of side 25 cm, what is the length of the side of the floor?

SSC Phase-XIV (Matric) 25 Sep 2026, Shift-III

(a) 7.5 m (b) 8 m (c) 9 m (d) 10 m

56 The diameter of a circle is 42 cm. What is its circumference? (Use $\pi = \frac{22}{7}$)

SSC Phase-XIV (Matric) 25 Sep 2026, Shift-III

(a) 126 cm (b) 132 cm (c) 138 cm (d) 144 cm

57 A metal L-shaped bracket is made by cutting a small 3 cm × 3 cm square from the corner of a large 10 cm × 10 cm square sheet.
What is the perimeter of the final L-shaped bracket?

SSC Phase-XIV (Matric) 25 Sep 2026, Shift-III

(a) 30 cm (b) 40 cm (c) 20 cm (d) 50 cm

58 A rectangle of 2 cm × 3 cm is cut off from one corner of a 10 cm × 8 cm rectangle. What is the perimeter of the new figure?

SSC Phase-XIV (Matric) 25 Sep 2026, Shift-III

(a) 19 cm (b) 22 cm (c) 30 cm (d) 36 cm

Answer Key *SSC official key*

Mensuration (2D) (Q. 01–58)

01	(d)	02	(c)	03	(c)	04	(b)	05	(a)	06	(c)	07	(b)	08	(b)	09	(c)	10	(c)
11	(a)	12	(c)	13	(b)	14	(c)	15	(a)	16	(d)	17	(a)	18	(c)	19	(c)	20	(a)
21	(b)	22	(a)	23	(d)	24	(b)	25	(c)	26	(c)	27	(b)	28	(c)	29	(b)	30	(b)
31	(c)	32	(b)	33	(c)	34	(c)	35	(c)	36	(c)	37	(a)	38	(b)	39	(c)	40	(d)
41	(a)	42	(a)	43	(b)	44	(a)	45	(d)	46	(c)	47	(a)	48	(c)	49	(a)	50	(d)
51	(b)	52	(b)	53	(a)	54	(c)	55	(c)	56	(b)	57	(b)	58	(d)				

Detailed Explanations रटना बंद, समझना शुरू

Mensuration (2D)

01 ANSWER (d) 36 cm

SSC Phase-XIV (Graduation) 17 Sep 2026, Shift-I

Formula: Perimeter Perimeter of a square = 4 × side, and perimeter of a regular hexagon = 6 × side

First find the side of the square: $\frac{24}{4} = 6$ cm. This is also the side of the hexagon.

Perimeter of the hexagon $= 6 \times 6 = 36$ cm, so it is **36 cm**.

Short Trick The side is the same, so the perimeter changes only in the ratio of the number of sides: $24 \times \frac{6}{4} = 36$.

02 ANSWER (c) 44 cm

SSC Phase-XIV (Graduation) 17 Sep 2026, Shift-I

Formula: Arc Length $l = \frac{\theta}{360^\circ} \times 2\pi r$

Full circumference $= 2 \times \frac{22}{7} \times 21 = 132$ cm

120° means one-third of the circle.

$l = \frac{120}{360} \times 132 = \frac{1}{3} \times 132 = 44$ cm, so the arc is **44 cm**

long.

03 **ANSWER (c)** $40 \div \left(\frac{5\pi}{2}\right)$

SSC Phase-XIV (Graduation) 18 Sep 2026, Shift-I

Formula: Radian Measure Arc $s = r\theta$ (θ in radians), so $r = \frac{s}{\theta}$

Here the arc $s = 40$ m and the angle $\theta = \frac{5\pi}{2}$ radians.

$r = \frac{40}{5\pi/2} = 40 \div \left(\frac{5\pi}{2}\right) = \frac{16}{\pi} \approx 5.09$ m

Option (C) shows exactly this form, so the correct option is $40 \div \left(\frac{5\pi}{2}\right)$.

Examiner's Trap On simplifying, you get $\frac{16}{\pi}$, not just 16. That is why option (A) is wrong.

04 **ANSWER (b)** 22

SSC Phase-XIV (Graduation) 18 Sep 2026, Shift-I

Concept: Bending a Wire Bending a wire does not change its length. Circumference of the circle = perimeter of the square

Circumference $= 2 \times \frac{22}{7} \times 14 = 88$ cm

This 88 is now shared among the four sides of the square: $\frac{88}{4} = 22$ cm. Answer: **22**.

Short Trick In one line: side $= \frac{2\pi r}{4} = \frac{\pi r}{2} = \frac{22}{7} \times 7 = 22$.

05 **ANSWER (a)** $6\sqrt{2}$ cm

SSC Phase-XIV (Graduation) 18 Sep 2026, Shift-I

Formula: Square Area $= a^2$, so $a = \sqrt{A}$

Break 72 so that a perfect square comes out: $a = \sqrt{72} = \sqrt{36 \times 2} = 6\sqrt{2}$ cm

So the side is $6\sqrt{2}$ **cm**.

Examiner's Trap $\sqrt{72}$ cm is not wrong in value, but the question asks for the simplest surd form. So you must write $6\sqrt{2}$.

06 **ANSWER (c)** Increases 4 times

SSC Phase-XIV (Graduation) 19 Sep 2026, Shift-I

Rule: Area $\propto$ Side² Area of a regular hexagon $= \frac{3\sqrt{3}}{2}a^2$, which means area $\sim a^2$

Double the side, $a \to 2a$. Now the area is

$\frac{3\sqrt{3}}{2}(2a)^2 = 4 \times \frac{3\sqrt{3}}{2}a^2$

So the area becomes 4 times the original. It **Increases 4 times**.

Short Trick Remember, for any similar figure, if the side becomes k times, the area becomes k^2 times.

07 **ANSWER (b)** 45°

SSC Phase-XIV (Graduation) 19 Sep 2026, Shift-I

Formula: Sector Area $= \frac{\theta}{360^\circ} \times \pi r^2$

First the area of the full circle: $\frac{22}{7} \times 28 \times 28 = 2464$ sq cm

What part of it is the sector? $\frac{\theta}{360} = \frac{308}{2464} = \frac{1}{8}$, $\theta = 45^\circ$

So the central angle comes to **45°**.

08 **ANSWER (b)** 11.54

SSC Phase-XIV (Graduation) 21 Sep 2026, Shift-I

Formula: Regular Hexagon The side of a regular hexagon inscribed in a circle = radius r of the circle. Area $= \frac{3\sqrt{3}}{2}r^2$

$\frac{3\sqrt{3}}{2}r^2 = 200\sqrt{3}$, $r^2 = \frac{400}{3}$

$r = \frac{20}{\sqrt{3}} \approx \frac{20}{1.732} \approx 11.54$ cm

So the radius is about **11.54**.

Short Trick Think of the hexagon as 6 equilateral triangles: $6 \times \frac{\sqrt{3}}{4}r^2 = 200\sqrt{3}$. This also gives the same $r^2 = \frac{400}{3}$.

09 **ANSWER (c)** 352 m

SSC Phase-XIV (Graduation) 21 Sep 2026, Shift-I

Formula: Circumference One round = one circumference $= 2\pi r$

Circumference $= 2 \times \frac{22}{7} \times 28 = 176$ m

In 2 rounds it is $2 \times 176 = 352$ m, so the distance is **352 m**.

Examiner's Trap Don't stop at 176 m, that is just one round. The question asks for 2 complete rounds.

10 **ANSWER (c)** 60°

SSC Phase-XIV (Graduation) 22 Sep 2026, Shift-I

Formula: Sector Area $= \frac{\theta}{360^\circ} \times \pi r^2$

Full area of the circle $= \frac{22}{7} \times 21 \times 21 = 1386$ sq cm

$\frac{\theta}{360} = \frac{231}{1386} = \frac{1}{6}$, so $\theta = 60^\circ$

The central angle is **60°**. Note that 231 × 6 = 1386, so the sector is exactly one-sixth of the circle.

---

11 **ANSWER (a)** 38.5 cm²

SSC Phase-XIV (Graduation) 23 Sep 2026, Shift-I

Formula: Quadrant Area of a quadrant $= \frac{1}{4}\pi r^2$

Full circle $= \frac{22}{7} \times 7 \times 7 = 154$ cm²

One-fourth of it: $\frac{154}{4} = 38.5$ cm². That gives **38.5 cm²**.

---

12 **ANSWER (c)** 8π cm

SSC Phase-XIV (Graduation) 23 Sep 2026, Shift-I

Formula: Sector and Arc Area of a sector $= \frac{1}{2} \times l \times r$, where l is the arc length

Put in the values: $\frac{1}{2} \times l \times 8 = 32\pi$

$4l = 32\pi$, $l = 8\pi$ cm

The arc length comes out to 8π **cm**.

Short Trick Use the $A = \frac{1}{2}lr$ formula and you don't even need the angle: $l = \frac{2A}{r} = \frac{64\pi}{8}$.

---

13 **ANSWER (b)** 11 cm

SSC Phase-XIV (Graduation) 24 Sep 2026, Shift-I

Formula: Arc Length $l = \frac{\theta}{360^\circ} \times 2\pi r$

Circumference $= 2 \times \frac{22}{7} \times 42 = 264$ cm

15° is $\frac{1}{24}$ of 360°: $l = \frac{15}{360} \times 264 = \frac{264}{24} = 11$ cm

The arc is **11 cm**.

---

14 **ANSWER (c)** 60 cm²

SSC Phase-XIV (Graduation) 24 Sep 2026, Shift-I

Concept: Tangent At the point of contact $\angle OTP = 90^\circ$, so $PT = \sqrt{OP^2 - r^2}$

$PT = PS = \sqrt{13^2 - 5^2} = \sqrt{144} = 12$ cm

Split PTOS into two equal right-angled triangles $\triangle OTP$ and $\triangle OSP$. Area of each $= \frac{1}{2} \times 5 \times 12 = 30$ cm²

Total $= 2 \times 30 = 60$ cm², so the area is **60 cm²**.

Short Trick Direct method: area = radius × length of tangent $= 5 \times 12 = 60$.

---

15 **ANSWER (a)** 5 cm

SSC Phase-XIV (Graduation) 25 Sep 2026, Shift-I

Formula: Circumference Circumference $= 2\pi r$, so $r = \frac{C}{2\pi}$

Seeing 31.4 here, you should know at once to take $\pi = 3.14$: $r = \frac{31.4}{2 \times 3.14} = \frac{31.4}{6.28} = 5$ cm

The radius is **5 cm**.

---

16 **ANSWER (d)** 2π cm

SSC Phase-XIV (Graduation) 25 Sep 2026, Shift-I

Formula: Radian Measure Arc $l = r\theta$ (θ in radians)

$l = 6 \times \frac{\pi}{3} = 2\pi$ cm

So the arc length is 2π **cm**.

Short Trick $\frac{\pi}{3}$ radians = 60°, which is $\frac{1}{6}$ of the circle: $\frac{1}{6} \times 2\pi \times 6 = 2\pi$.

---

17 **ANSWER (a)** 22 cm

SSC Phase-XIV (12th) 17 Sep 2026, Shift-II

Formula: Arc Length $l = \frac{\theta}{360^\circ} \times 2\pi r$

Circumference $= 2 \times \frac{22}{7} \times 14 = 88$ cm

90° means a quarter of the circle, so $l = \frac{88}{4} = 22$ cm.

Answer: **22 cm**.

---

18 **ANSWER (c)** 15 cm

SSC Phase-XIV (12th) 17 Sep 2026, Shift-II

Formula: Parallelogram Area = base × height

Let the height $= 14k$ and the base $= 9k$.

$14k \times 9k = 126k^2 = 1134$, $k^2 = 9$, $k = 3$

Height $= 42$ cm, base $= 27$ cm

Difference between them $= 42 - 27 = 15$ cm

So the difference is **15 cm**.

Short Trick No need to find each side separately. Difference $= (14 - 9)k = 5k = 5 \times 3 = 15$.

---

19 **ANSWER (c)** $14\sqrt{5}$ cm²

SSC Phase-XIV (12th) 17 Sep 2026, Shift-II

Formula: Heron's Area $= \sqrt{s(s-a)(s-b)(s-c)}$, where $s = \frac{a+b+c}{2}$

First find s: $s = \frac{7+9+12}{2} = 14$
$s-a = 7,\ s-b = 5,\ s-c = 2$

Area $= \sqrt{14 \times 7 \times 5 \times 2} = \sqrt{980} = \sqrt{196 \times 5} = 14\sqrt{5}$ cm²

In the options, this matches $14\sqrt{5}$ **cm²**.

20 ANSWER (a) 294 m²

SSC Phase-XIV (12th) 21 Sep 2026, Shift-II

Concept: Composite Figure Total area = area of rectangle + area of triangle

Rectangle $= 20 \times 12 = 240$ m²

Right-angled triangle $= \frac{1}{2} \times 12 \times 9 = 54$ m²

Add the two: $240 + 54 = 294$ m². The whole plot is **294 m²**.

21 ANSWER (b) 12 cm

SSC Phase-XIV (12th) 21 Sep 2026, Shift-II

Formula: Trapezium Area $= \frac{1}{2} \times$ (sum of parallel sides) $\times h$

$\frac{1}{2} \times (20 + 10) \times h = 180$
$15h = 180,\ h = 12$ cm

The distance between the parallel sides is **12 cm**.

Examiner's Trap The fact that the non-parallel sides are equal is of no use here. The area formula gives h directly.

22 ANSWER (a) 11 cm

SSC Phase-XIV (12th) 22 Sep 2026, Shift-II

Formula: Arc Length $l = \frac{\theta}{360^\circ} \times 2\pi r$

Circumference $= 2 \times \frac{22}{7} \times 10.5 = 66$ cm

60° is one-sixth of the circle. $l = \frac{60}{360} \times 66 = \frac{66}{6} = 11$ cm, so the answer is **11 cm**.

23 ANSWER (d) 384 cm²

SSC Phase-XIV (12th) 22 Sep 2026, Shift-II

Formula: Rectangle Perimeter $= 2(l+b)$, area $= l \times b$

First find x: $2(x+16) = 80,\ x+16 = 40,\ x = 24$ cm

Now area $= 24 \times 16 = 384$ cm². That makes **384 cm²** the correct option.

24 ANSWER (b) 84 cm²

SSC Phase-XIV (12th) 22 Sep 2026, Shift-II

Formula: Heron Area $= \sqrt{s(s-a)(s-b)(s-c)}$, where $s = \frac{a+b+c}{2}$

First find the semi-perimeter: $s = \frac{13+14+15}{2} = \frac{42}{2} = 21$ cm

Now $s-a = 8,\ s-b = 7,\ s-c = 6$
Area $= \sqrt{21 \times 8 \times 7 \times 6} = \sqrt{7056} = 84$ cm². So the answer is **84 cm²**.

Short Trick The 13, 14, 15 triangle is an old friend in the exam. Its area is always 84, so remember it. Take 14 as the base and the height comes out as 12: $\frac{1}{2} \times 14 \times 12 = 84$.

25 ANSWER (c) $10\sqrt{2}$ cm

SSC Phase-XIV (12th) 24 Sep 2026, Shift-II

Formula: Square Diagonal Diagonal $= a\sqrt{2}$, perimeter of rectangle $= 2(l+b)$

We are given l + b = 28, so the perimeter of the rectangle $= 2 \times 28 = 56$ cm

The rest belongs to the square: $96 - 56 = 40$ cm. That gives side of the square $= \frac{40}{4} = 10$ cm

Diagonal $= 10\sqrt{2}$ cm. The correct option is $10\sqrt{2}$ **cm**.

26 ANSWER (c) 68 cm

SSC Phase-XIV (12th) 24 Sep 2026, Shift-II

Concept: Rhombus The diagonals bisect each other at right angles. Side $= \sqrt{(\frac{d_1}{2})^2 + (\frac{d_2}{2})^2}$

Take half of each diagonal: 8 cm and 15 cm

Side $= \sqrt{8^2 + 15^2} = \sqrt{64 + 225} = \sqrt{289} = 17$ cm

Perimeter $= 4 \times 17 =$ **68 cm**

Examiner's Trap If you plug in the full diagonals 16 and 30 and take $\sqrt{16^2 + 30^2} = 34$, the perimeter comes out as 136, which is wrong. Always use the half-diagonals.

27 **ANSWER (b)** 9 cm

SSC Phase-XIV (12th) 25 Sep 2026, Shift-II

Formula: Parallelogram Area = base × corresponding height $= b_1h_1 = b_2h_2$

Take the longer side, 12 cm, as the base. Area $= 12 \times 6 = 72$ cm²

Now put the same area on the shorter side of 8 cm: $8 \times h = 72 \Rightarrow h = 9$ cm. That makes option (b) **9 cm** correct.

Short Trick Just write $12 \times 6 = 8 \times h$. The shorter the side, the greater the height on it. So the answer has to be more than 6.

28 **ANSWER (c)** 20 cm

SSC Phase-XIV (12th) 25 Sep 2026, Shift-II

Formula: Transverse Tangent Length $= \sqrt{d^2 - (r_1 + r_2)^2}$

Here $d = 25$ and $r_1 + r_2 = 8 + 7 = 15$

Length $= \sqrt{25^2 - 15^2} = \sqrt{625 - 225} = \sqrt{400} = 20$ cm, which is **20 cm**.

Examiner's Trap For a direct common tangent you subtract $(r_1 - r_2)^2$, and for a transverse one you subtract $(r_1 + r_2)^2$. In the exam, these two are the ones they try to mix up.

29 **ANSWER (b)** $\frac{420}{29}$ m

SSC Phase-XIV (12th) 25 Sep 2026, Shift-II

Formula: Hypotenuse Altitude Altitude on hypotenuse $= \frac{a \times b}{c}$ (a, b are the legs, c is the hypotenuse)

First, check: $20^2 + 21^2 = 400 + 441 = 841 = 29^2$. So the triangle is right-angled and the hypotenuse is 29 m.

Area $= \frac{1}{2} \times 20 \times 21 = 210$ m²

Now make the hypotenuse the base: $\frac{1}{2} \times 29 \times h = 210 \Rightarrow h = \frac{420}{29}$ m

The answer is $\frac{420}{29}$ **m**.

Examiner's Trap Option (A) $\frac{210}{29}$ is kept for students who forget to multiply the area by 2.

30 **ANSWER (b)** $150\sqrt{3}$ cm²

SSC Phase-XIV (12th) 25 Sep 2026, Shift-II

Formula: Regular Hexagon Area $= \frac{3\sqrt{3}}{2}a^2$ (6 equilateral triangles)

$a = 10$, so $a^2 = 100$

Area $= \frac{3\sqrt{3}}{2} \times 100 = 150\sqrt{3}$ cm². The correct option is $150\sqrt{3}$ **cm²**.

Short Trick Forgot the formula? Don't panic. A hexagon is made of 6 equilateral triangles: $6 \times \frac{\sqrt{3}}{4} \times 100 = 150\sqrt{3}$.

31 **ANSWER (c)** 250 cm²

SSC Phase-XIV (12th) 26 Sep 2026, Shift-I

Formula: Trapezium Area $= \frac{1}{2} \times$ (sum of parallel sides) $\times h$

Sum of parallel sides $= 18 + 32 = 50$ cm, then area $= \frac{1}{2} \times 50 \times 10 =$ **250 cm²**

32 **ANSWER (b)** 1320 cm²

SSC Phase-XIV (12th) 26 Sep 2026, Shift-I

Formula: Rhombus Side$^2 = (\frac{d_1}{2})^2 + (\frac{d_2}{2})^2$, Area $= \frac{1}{2}d_1d_2$

The perimeter is 244, so side $= \frac{244}{4} = 61$ cm

Let the half-diagonals be $11k$ and $60k$. Then $(11k)^2 + (60k)^2 = 61^2 \Rightarrow 3721k^2 = 3721 \Rightarrow k = 1$

So the half-diagonals are 11 and 60, and the full diagonals are 22 cm and 120 cm

Area $= \frac{1}{2} \times 22 \times 120 = 1320$ cm², so option (b) **1320 cm²** is correct.

Short Trick 11, 60, 61 is a Pythagorean triplet. The moment you see a side of 61, you know the half-diagonals must be 11 and 60.

33 **ANSWER (c)** 52 m

SSC Phase-XIV (Matric) 16 Sep 2026, Shift-III

Concept: Outer Path Outer side = inner side +2 × width of path

Side of the courtyard $= \sqrt{2304} = 48$ m

The path adds 2 m on each side, so outer side $= 48 + 2 \times 2 = 52$ m. That is **52 m**.

Examiner's Trap The most common mistake is adding just 2 m for one side and writing 50 m. Remember, the path runs on both sides.

34 **ANSWER (c)** 36%

SSC Phase-XIV (Matric) 16 Sep 2026, Shift-III

Concept: Area ∝ d² Area varies as the square of the diameter: $A \propto d^2$

The diameter falls by 20%, so the new diameter $= 0.8d$. New area $= (0.8)^2 = 0.64$ times

Decrease $= 1 - 0.64 = 0.36$, which means **36%**

Short Trick Use the successive change formula:
$-x - x + \frac{x^2}{100} = -20 - 20 + 4 = -36\%$

35 **ANSWER (c)** 144 cm²

SSC Phase-XIV (Matric) 16 Sep 2026, Shift-III

Both perimeters are equal. Perimeter of the rectangle $= 2(14 + 10) = 48$ cm, so the square's perimeter is also 48 cm

Side of the square $= \frac{48}{4} = 12$ cm, and area $= 12^2 = 144$ cm². Answer: **144 cm²**.

36 **ANSWER (c)** Rs 3360

SSC Phase-XIV (Matric) 16 Sep 2026, Shift-III

Concept: % to Fraction $33\frac{1}{3}\% = \frac{1}{3}$, so length $= \frac{4}{3} \times$ breadth

Get the area from the total grassing cost:
$\frac{18000}{15} = 1200$ m²
Take breadth $= 3x$ and length $= 4x$.
$12x^2 = 1200 \Rightarrow x^2 = 100 \Rightarrow x = 10$
So the breadth is 30 m and the length is 40 m

Perimeter $= 2(40 + 30) = 140$ m
Cost of fencing $= 140 \times 24 =$ Rs 3360, so the answer is **Rs 3360**.

37 **ANSWER (a)** 24 cm

SSC Phase-XIV (Matric) 17 Sep 2026, Shift-III

Concept: Corner Cut Cutting a rectangle or square from a corner does not change the perimeter

When the corner is cut, two outer pieces (2 + 2 cm) go away, but two new inner edges of the same length (2 + 2 cm) are formed.

So the perimeter stays the same as before: $4 \times 6 = 24$ cm, which is **24 cm**.

Examiner's Trap Subtracting the sides of the cut piece and writing 20 cm is wrong. Note that the area decreases here, not the perimeter.

38 **ANSWER (b)** 22 m

SSC Phase-XIV (Matric) 18 Sep 2026, Shift-III

The pond's area is 196, so its side $= \sqrt{196} = 14$ m

Difference $= 36 - 14 =$ **22 m**

39 **ANSWER (c)** 28 cm

SSC Phase-XIV (Matric) 18 Sep 2026, Shift-III

Formula: Circumference Length of wire = circumference $= 2\pi r$

$2 \times \frac{22}{7} \times r = 176$

$r = \frac{176 \times 7}{44} = 4 \times 7 = 28$ cm. The correct option is **28 cm**.

40 **ANSWER (d)** 36 cm

SSC Phase-XIV (Matric) 18 Sep 2026, Shift-III

Concept: Length of Wire The wire is the same, so circumference of circle = perimeter of rectangle

First, the length of the wire: $2 \times \frac{22}{7} \times 21 = 132$ cm

Let the sides of the rectangle be $6k$ and $5k$:
$2(6k + 5k) = 132 \Rightarrow 22k = 132 \Rightarrow k = 6$

Longer side $= 6 \times 6 =$ **36 cm**

41 **ANSWER (a)** 6962.5 m²

SSC Phase-XIV (Matric) 19 Sep 2026, Shift-III

Concept: Composite Figure Total area = rectangle + two semicircles, and two semicircles together make one full circle

Area of rectangle $= 100 \times 50 = 5000$ m²

The semicircles sit on the shorter sides (50 m), so the radius is 25 m. Put both together and you get one circle: $3.14 \times 25^2 = 3.14 \times 625 = 1962.5$ m²

Total $= 5000 + 1962.5 = 6962.5$ m². So the answer is **6962.5 m²**.

42 **ANSWER (a)** 324 m²

SSC Phase-XIV (Matric) 21 Sep 2026, Shift-III

Formula: Diff. of Squares $a^2 - b^2 = (a + b)(a - b)$

No need to work out the squares. Directly:
$30^2 - 24^2 = (30+24)(30-24) = 54 \times 6 = 324$ m²
The increase in area is **324 m²**.

43 **ANSWER (b)** 20

SSC Phase-XIV (Matric) 21 Sep 2026, Shift-III

Formula: Revolutions Number of revolutions = total distance ÷ circumference of wheel

In one revolution the wheel covers a distance equal to its circumference: $\pi d = \frac{22}{7} \times 70 = 220$ cm

Total distance $= 44$ m $= 4400$ cm
Revolutions $= \frac{4400}{220} = 20$, which is **20** revolutions.

Examiner's Trap Don't forget to convert units. Change 44 m to 4400 cm, or you will end up with an absurd answer like 0.2.

44 **ANSWER (a)** 124 cm

SSC Phase-XIV (Matric) 21 Sep 2026, Shift-III

Concept: Square Side = perimeter ÷ 4, area = side²

Divide each perimeter by 4. The sides are 6, 8, 10, 19 and 20 cm

Sum of areas $= 36 + 64 + 100 + 361 + 400 = 961$ cm²

Side of the sixth square $= \sqrt{961} = 31$ cm, so perimeter $= 4 \times 31 = 124$ cm. Option (a) **124 cm** is correct.

Short Trick You can also work directly with the perimeters:
$P = \sqrt{24^2 + 32^2 + 40^2 + 76^2 + 80^2} = \sqrt{15376} = 124$.

45 **ANSWER (d)** 19%

SSC Phase-XIV (Matric) 21 Sep 2026, Shift-III

Concept: Area ∝ r² $A \propto r^2$, net change $= -x - x + \frac{x^2}{100}$

The radius becomes 0.9r, so the area is left at $(0.9)^2 = 0.81$ times

Decrease $= 1 - 0.81 = 0.19$, which means **19%**

Examiner's Trap Doubling 10 to get 20% is the trap. With two successive decreases, $\frac{x^2}{100} = 1$ gets added back, and that is why it becomes 19.

46 **ANSWER (c)** 110 cm

SSC Phase-XIV (Matric) 22 Sep 2026, Shift-III

Formula: Circumference Circumference $= \pi d$

$\frac{22}{7} \times 35 = 22 \times 5 = 110$ cm. Answer: **110 cm**.

47 **ANSWER (a)** 36 cm²

SSC Phase-XIV (Matric) 22 Sep 2026, Shift-III

Formula: Equilateral Tri. Area $= \frac{\sqrt{3}}{4}a^2$

$\frac{\sqrt{3}}{4}a^2 = 16\sqrt{3} \Rightarrow a^2 = 64 \Rightarrow a = 8$ cm

Length of wire = perimeter of triangle $= 3 \times 8 = 24$ cm

The same wire forms the square, so side $= \frac{24}{4} = 6$ cm and area $= 6^2 = 36$ cm². The correct option is **36 cm²**.

Examiner's Trap Option (C) 24 is the length of the wire, not the area. Go all the way to the last step.

48 **ANSWER (c)** 16 units

SSC Phase-XIV (Matric) 22 Sep 2026, Shift-III

Concept: Midpoint Square A square formed by joining midpoints has exactly half the area of the previous square

From S_1 to S_5 the area is halved 4 times: $\frac{256}{2^4} = 16$ square units

So the side of S_5 $= \sqrt{16} = 4$ units and perimeter $= 4 \times 4 =$ **16 units**

Short Trick The side gets multiplied by $\frac{1}{\sqrt{2}}$ each time: 16, $8\sqrt{2}$, 8, $4\sqrt{2}$, 4. Remember, the side halves every two steps.

49 **ANSWER (a)** 1875 m²

SSC Phase-XIV (Matric) 23 Sep 2026, Shift-III

Side of the park $= \frac{200}{4} = 50$ m, area $= 50^2 = 2500$ m²

Difference $= 2500 - 625 = 1875$ m². That gives **1875 m²**.

50 **ANSWER (d)** 84 cm

SSC Phase-XIV (Matric) 23 Sep 2026, Shift-III

Concept: Inner Border Inner measurement = outer

measurement $-2\times$ width of border

The border is on both sides. Length of photo $=30-2\times2=26$ cm, breadth $=20-2\times2=16$ cm

Perimeter $=2(26+16)=$ **84 cm**

Short Trick Quick way: the frame's perimeter is 100. An inner border reduces the perimeter by $8w$, so $100-8\times2=84$ cm.

51 **ANSWER (b)** 48 cm

SSC Phase-XIV (Matric) 23 Sep 2026, Shift-III

Concept: Corner Cut If a square is cut from a corner, the perimeter stays the same

At the corner, two outer edges (4 + 4) are removed, but two inner edges of the same length (4 + 4) take their place.

So the perimeter $=4\times12=48$ cm, which is **48 cm**.

52 **ANSWER (b)** Rs528

SSC Phase-XIV (Matric) 24 Sep 2026, Shift-III

Formula: Circumference Circumference $=2\pi r$, cost = circumference × rate

Circumference $=2\times\frac{22}{7}\times21=132$ m, and cost $=132\times4=$ **Rs528**

53 **ANSWER (a)** 40 cm

SSC Phase-XIV (Matric) 24 Sep 2026, Shift-III

Concept: Corner Cut Cutting a rectangle from a corner leaves the perimeter unchanged

Whatever length of edge is removed from the outside (4 + 2) is formed again on the inside (4 + 2).

So the perimeter $=2(12+8)=40$ cm. The correct option is **40 cm**.

54 **ANSWER (c)** 70 cm

SSC Phase-XIV (Matric) 24 Sep 2026, Shift-III

Concept: Corner Cut In a corner cut, the perimeter does not change

The perimeter stays equal to that of the original rectangle: $2(20+15)=70$ cm, so the answer is **70 cm**.

Examiner's Trap Taking $70-10=60$ cm is wrong. The inner edges of the cut part are also added to the perimeter.

55 **ANSWER (c)** 9 m

SSC Phase-XIV (Matric) 25 Sep 2026, Shift-III

$1296=36^2$, which means 36 tiles lie along each side of the floor.

Side of the floor $=36\times25=900$ cm $=9$ m. So option (c) **9 m** is correct.

Short Trick You can also do it with area: one tile is 0.0625 m², so $1296\times0.0625=81$ m², and side $=\sqrt{81}=9$ m.

56 **ANSWER (b)** 132 cm

SSC Phase-XIV (Matric) 25 Sep 2026, Shift-III

Formula: Circumference Circumference $=\pi d$

The diameter is 42, which cancels neatly with 7: $\frac{22}{7}\times42=22\times6=$ **132 cm**

57 **ANSWER (b)** 40 cm

SSC Phase-XIV (Matric) 25 Sep 2026, Shift-III

Concept: Corner Cut If a corner is cut to make an L-shape, the perimeter stays the same

The outer edges that were removed (3 + 3) come back as new inner edges (3 + 3).

So the perimeter of the bracket $=4\times10=40$ cm, that is, **40 cm**.

58 **ANSWER (d)** 36 cm

SSC Phase-XIV (Matric) 25 Sep 2026, Shift-III

Concept: Corner Cut When a small rectangle is cut from the corner of a rectangle, the outer perimeter does not change at all. It stays exactly what the original rectangle had.

Why? The cut removes two sides of 2 cm and 3 cm, but two new sides of the same lengths (3 cm and 2 cm) appear on the inner side.

So the new perimeter = original perimeter = $2(10+8)=36$ cm, that is **36 cm**.

Examiner's Trap Many students subtract $2(2+3)=10$ and write 26, or add the cut sides and get 46. Both

are wrong. In a corner cut, the perimeter stays the same.

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22
CHAPTER

Mensuration (3D)

Questions *77 questions · 24 shifts*

Mensuration (3D)

Directions (Q. 01–77): *Choose the correct answer from the four given options.*

01 The total surface area of a hemisphere is 462 cm². What is its curved surface area? (Use $\pi = \frac{22}{7}$)

SSC Phase-XIV (Graduation) 17 Sep 2026, Shift-I

(a) 283 cm² (b) 329 cm² (c) 308 cm² (d) 258 cm²

02 In a right square pyramid, the ratio of the area of the base to the area of one lateral face is 2:1. Find the angle made by a lateral face with the base.

SSC Phase-XIV (Graduation) 17 Sep 2026, Shift-I

(a) 30° (b) 45° (c) 60° (d) 75°

03 A cylinder has a radius of 2.5 cm and a height of 10 cm. Find its volume (use $\pi = 3.14$).

SSC Phase-XIV (Graduation) 18 Sep 2026, Shift-I

(a) 196.25 cm³ (b) 178.5 cm³
(c) 198.75 cm³ (d) 200 cm³

04 The volume of a rectangular prism is 288 cm³ and the dimensions of its base are 6 cm and 4 cm. Find its height.

SSC Phase-XIV (Graduation) 18 Sep 2026, Shift-I

(a) 10 cm (b) 11 cm (c) 12 cm (d) 13 cm

05 The side of the base of a square pyramid is 6 cm and its height is 9 cm. Find its volume.

SSC Phase-XIV (Graduation) 18 Sep 2026, Shift-I

(a) 118 cm³ (b) 108 cm³
(c) 208 cm³ (d) None of these

06 The ratio of the volumes of two hemispheres is 27 : 64. What is the ratio of their total surface areas?

SSC Phase-XIV (Graduation) 19 Sep 2026, Shift-I

(a) 3 : 4 (b) 9 : 16
(c) 27 : 64 (d) 81 : 256

07 The diagonal of the square base of a right square pyramid is $10\sqrt{2}$ cm. If the lateral surface area of the pyramid is 260 cm², calculate the volume of the pyramid.

SSC Phase-XIV (Graduation) 19 Sep 2026, Shift-I

(a) 400 cm³ (b) 300 cm³ (c) 450 cm³ (d) 350 cm³

08 The area of the base of a prism is 35 cm² and its height is 6.5 cm. What is its volume?

SSC Phase-XIV (Graduation) 21 Sep 2026, Shift-I

(a) 220 cm³ (b) 227.5 cm³
(c) 230 cm³ (d) 240 cm³

09 An architect is designing a square-based pyramid for a public monument. The perimeter of the base is 60 m, and the total lateral surface area (sum of all four triangular faces) is 500 m². To finalise the design, the architect needs to find the vertical height of the pyramid.

SSC Phase-XIV (Graduation) 21 Sep 2026, Shift-I

(a) 15 m (b) 14.88 m
(c) 16.67 m (d) 14 m

10 A hemispherical water tank has an internal radius of 21 m. It is full of water and is being emptied by a pump at the rate of 100 litres per second. How much time will it take to empty the

whole tank? (Use $\pi = \frac{22}{7}$)

SSC Phase-XIV (Graduation) 22 Sep 2026, Shift-I

(a) 55 hours and 12 minutes
(b) 55 hours and 30 minutes
(c) 53 hours and 45 minutes
(d) 53 hours and 54 minutes

11 A plane parallel to the base of a pyramid cuts it at half of its vertical height from the vertex. What is the ratio of the volume of the smaller pyramid to the volume of the frustum formed?

SSC Phase-XIV (Graduation) 22 Sep 2026, Shift-I

(a) 1:8 (b) 1:7 (c) 2:9 (d) 2:7

12 In a square pyramid, the side of the base is 6 cm and the slant height is 10 cm. Find the lateral surface area.

SSC Phase-XIV (Graduation) 23 Sep 2026, Shift-I

(a) 120 cm² (b) 130 cm² (c) 140 cm² (d) 150 cm²

13 An architect is designing a skylight in the shape of a right prism with a rectangular base measuring 9 cm by 12 cm and a height of 16 cm. For the structural support plan, determine the length of the longest diagonal of the prism.

SSC Phase-XIV (Graduation) 23 Sep 2026, Shift-I

(a) 23 cm (b) 22.5 cm
(c) 21.93 cm (d) 20.5 cm

14 If the radius of a hemisphere is 7 cm, what is the difference between its total surface area and its curved surface area?

SSC Phase-XIV (Graduation) 24 Sep 2026, Shift-I

(a) 154 cm² (b) 77 cm² (c) 169 cm² (d) 88 cm²

15 A square pyramid is cut by a plane parallel to its base at a point one-third of the way down its height from the vertex. If the volume of the original pyramid is 540 cm³, find the volume of the resulting frustum.

SSC Phase-XIV (Graduation) 24 Sep 2026, Shift-I

(a) 415 cm³ (b) 578 cm³ (c) 520 cm³ (d) 480 cm³

16 The base of a prism is a parallelogram with base 6 cm and height 5 cm, and the height of the prism is 11 cm. Find its volume.

SSC Phase-XIV (Graduation) 25 Sep 2026, Shift-I

(a) 280 cm³ (b) 270 cm³ (c) 260 cm³ (d) 330 cm³

17 The lateral surface area of a square pyramid is 312 cm² and its slant height is 13 cm. Find the side of the base.

SSC Phase-XIV (Graduation) 25 Sep 2026, Shift-I

(a) 12 cm (b) 14 cm (c) 16 cm (d) 18 cm

18 The area of the base of a right prism is 54 cm², the perimeter of the base is 30 cm and its height is 8 cm. What is its total surface area?

SSC Phase-XIV (12th) 16 Sep 2026, Shift-II

(a) 240 cm² (b) 294 cm² (c) 348 cm² (d) 432 cm²

19 The length, breadth and height of a cuboid are in the ratio 2 : 3 : 6 and its diagonal is 21 cm. Find its volume.

SSC Phase-XIV (12th) 16 Sep 2026, Shift-II

(a) 486 cm³ (b) 729 cm³
(c) 972 cm³ (d) 1458 cm³

20 The side of the base of a right square pyramid is 12 cm and its vertical height is 8 cm. What is its total surface area?

SSC Phase-XIV (12th) 16 Sep 2026, Shift-II

(a) 288 cm² (b) 336 cm² (c) 384 cm² (d) 432 cm²

21 A hemispherical bowl has a radius of 9 cm and is completely filled with water. What is its volume?

SSC Phase-XIV (12th) 16 Sep 2026, Shift-II

(a) 243π cm³ (b) 324π cm³
(c) 486π cm³ (d) 729π cm³

22 A dessert consists of a cone of radius 3.5 cm and height 12 cm, with a hemispherical scoop of radius 3.5 cm placed on top of it. Find the total volume of the dessert.

SSC Phase-XIV (12th) 17 Sep 2026, Shift-II

(a) 243.83 cm³ (b) 678.89 cm³
(c) 220.45 cm³ (d) 324.57 cm³

23 A cylindrical water tank of height 1.5 m and diameter 1.4 m is completely full. Find approximately how much water it holds (in litres).

SSC Phase-XIV (12th) 17 Sep 2026, Shift-II

(a) 2200 litres (b) 2400 litres
(c) 2150 litres (d) 2310 litres

24 If a solid metal sphere of radius 4.2 cm is melted and recast into small spheres of radius 0.7 cm, what will be the total number of small spheres?

SSC Phase-XIV (12th) 17 Sep 2026, Shift-II

(a) 450 (b) 200 (c) 216 (d) 345

25 If the height of a cylinder is decreased by 20% and its radius is increased by 25%, what will be the percentage change in its curved surface area? (Use approximation only)

SSC Phase-XIV (12th) 17 Sep 2026, Shift-II

(a) 5% increase (b) 4% decrease
(c) 10% increase (d) No change

26 The curved surface area of a cone is 220π cm² and its radius is 10 cm. What is the slant height of the cone?

SSC Phase-XIV (12th) 17 Sep 2026, Shift-II

(a) 11 cm (b) 18 cm (c) 22 cm (d) 24 cm

27 The base of a right prism is an equilateral triangle of side 12 cm and its height is 10 cm. Find the exact volume of the prism.

SSC Phase-XIV (12th) 18 Sep 2026, Shift-II

(a) $120\sqrt{3}$ cm³ (b) $240\sqrt{3}$ cm³
(c) $360\sqrt{3}$ cm³ (d) $720\sqrt{3}$ cm³

28 A rectangular parallelepiped (cuboid) has length 12 cm, breadth 9 cm and height 8 cm. Find its volume.

SSC Phase-XIV (12th) 18 Sep 2026, Shift-II

(a) 729 cm³ (b) 768 cm³ (c) 864 cm³ (d) 936 cm³

29 The side of the base of a square pyramid is 9 cm and its vertical height is 12 cm. What is its volume?

SSC Phase-XIV (12th) 18 Sep 2026, Shift-II

(a) 243 cm³ (b) 324 cm³ (c) 486 cm³ (d) 972 cm³

30 A hemispherical bowl is open at the top and its internal radius is 10 cm. What is its exact internal curved surface area?

SSC Phase-XIV (12th) 18 Sep 2026, Shift-II

(a) 100π cm² (b) 150π cm²
(c) 200π cm² (d) 300π cm²

31 The base of a right prism is a square of side 9 cm and its height is 20 cm. Find its total surface area.

SSC Phase-XIV (12th) 19 Sep 2026, Shift-II

(a) 720 cm² (b) 801 cm² (c) 882 cm² (d) 900 cm²

32 The dimensions of a cuboid are 10 cm, 6 cm and 4 cm. What is its total surface area?

SSC Phase-XIV (12th) 19 Sep 2026, Shift-II

(a) 200 cm² (b) 224 cm² (c) 248 cm² (d) 280 cm²

33 The side of the base of a right square pyramid is 10 cm and its slant height is 13 cm. What is its lateral surface area?

SSC Phase-XIV (12th) 19 Sep 2026, Shift-II

(a) 130 cm² (b) 200 cm² (c) 260 cm² (d) 360 cm²

34 A closed hemispherical dome has a radius of 6 cm. Its total surface area includes the curved surface and the circular base. What is the total surface area?

SSC Phase-XIV (12th) 19 Sep 2026, Shift-II

(a) 72π cm² (b) 96π cm²
(c) 108π cm² (d) 144π cm²

35 A conical vessel of radius 10 cm and height 24 cm is completely filled with water. How many cylindrical bottles of radius 2.5 cm and height 6 cm can be filled from it? (Use $\pi = 3.14$)

SSC Phase-XIV (12th) 22 Sep 2026, Shift-II

(a) 29 (b) 21 (c) 34 (d) 25

36 A right circular cylinder has the same height and radius as a cone. What is the ratio of their volumes?

SSC Phase-XIV (12th) 22 Sep 2026, Shift-II

(a) 2:1 (b) 1:3 (c) 1:2 (d) 3:1

37 The total surface area of a hemisphere is 1,360.80 cm². Find the volume of a sphere whose radius is 10 cm less than the radius of the given hemisphere. (Take $\pi = 3.15$)

SSC Phase-XIV (12th) 22 Sep 2026, Shift-II

(a) 48.5 cm³ (b) 33.6 cm³
(c) 32.4 cm³ (d) 42.6 cm³

38 Three solid spheres of radii 3 cm, 4 cm and 5 cm are melted to form one large solid sphere. What is the radius of the new sphere?

SSC Phase-XIV (12th) 22 Sep 2026, Shift-II

(a) 6 cm (b) 8 cm (c) 2 cm (d) 4 cm

39 A cone has a radius of 9 cm and a slant height of 15 cm. Find its total surface area.

SSC Phase-XIV (12th) 22 Sep 2026, Shift-II

(a) 135π cm² (b) 216π cm²
(c) 270π cm² (d) 324π cm²

40 The base of a right triangular prism is a right-angled triangle whose perpendicular sides are 6 cm and 8 cm. The length of the prism is 15 cm. What is its volume?

SSC Phase-XIV (12th) 23 Sep 2026, Shift-II

(a) 240 cm³ (b) 300 cm³ (c) 360 cm³ (d) 480 cm³

41 The dimensions of a rectangular box are 6 cm, 8 cm and 24 cm. What is the length of the longest rod that can be placed inside it?

SSC Phase-XIV (12th) 23 Sep 2026, Shift-II

(a) 24 cm (b) 25 cm (c) 26 cm (d) 28 cm

42 The base of a regular right pyramid is an equilateral triangle of side 6 cm and its vertical height is 4 cm. What is its volume?

SSC Phase-XIV (12th) 23 Sep 2026, Shift-II

(a) $9\sqrt{3}$ cm³ (b) $12\sqrt{3}$ cm³
(c) $18\sqrt{3}$ cm³ (d) $36\sqrt{3}$ cm³

43 A solid hemisphere has a radius of 7 cm. Find its curved surface area.

SSC Phase-XIV (12th) 23 Sep 2026, Shift-II

(a) 49π cm² (b) 98π cm²
(c) 147π cm² (d) 196π cm²

44 A tent is in the shape of a right circular cone with radius 7 m and height 24 m. The canvas covers only the curved surface, and it costs Rs84 per m². What is the total cost of the canvas required? (Use $\pi = \frac{22}{7}$)

SSC Phase-XIV (12th) 25 Sep 2026, Shift-II

(a) Rs45,200 (b) Rs67,800
(c) Rs46,200 (d) Rs67,589

45 A cone and a sphere have the same radius and the same volume. Find the ratio of the diameter of the sphere to the height of the cone.

SSC Phase-XIV (12th) 25 Sep 2026, Shift-II

(a) 1:2 (b) 2:1 (c) 3:2 (d) 2:3

46 A closed cylindrical tin has a radius of 5 cm and a height of 12 cm. What is its total surface area?

SSC Phase-XIV (12th) 25 Sep 2026, Shift-II

(a) 120π cm² (b) 150π cm²
(c) 170π cm² (d) 240π cm²

47 A right circular cone has a radius of 6 cm and a height of 14 cm. What is its volume?

SSC Phase-XIV (12th) 25 Sep 2026, Shift-II

(a) 144π cm³ (b) 168π cm³
(c) 196π cm³ (d) 504π cm³

48 The volume of a hemisphere is 486π cm³. What is its curved surface area?

SSC Phase-XIV (12th) 25 Sep 2026, Shift-II

(a) 81π cm² (b) 162π cm²
(c) 243π cm² (d) 324π cm²

49 The dimensions of a rectangular parallelepiped (cuboid) are 15 cm, 10 cm and 8 cm. If its length is increased by 3 cm, what will be the increase in its volume?

SSC Phase-XIV (Matric) 16 Sep 2026, Shift-III

(a) 180 cm³ (b) 210 cm³ (c) 240 cm³ (d) 270 cm³

50 In a right circular cone, the radius is 21 cm and the height is 72 cm. Find the slant height of the cone.

SSC Phase-XIV (Matric) 16 Sep 2026, Shift-III

(a) 75 cm (b) 78 cm (c) 69 cm (d) 84 cm

51 A solid right circular cylinder of radius 8 cm and height 9 cm is melted and recast into 4 identical solid cylinders, each of radius 6 cm. What is the

height of each new cylinder?

SSC Phase-XIV (Matric) 16 Sep 2026, Shift-III

(a) 3 cm (b) 4 cm (c) 5 cm (d) 6 cm

52 When the radius of a sphere is increased by 50%, its total surface area increases by 770 cm². What was the original radius of the sphere? (Use $\pi = \frac{22}{7}$)

SSC Phase-XIV (Matric) 16 Sep 2026, Shift-III

(a) 5 cm (b) 7 cm (c) 10 cm (d) 14 cm

53 The radius of a cone is 7 cm and its slant height is 25 cm. Find the height of the cone.

SSC Phase-XIV (Matric) 17 Sep 2026, Shift-III

(a) 24 cm (b) 26 cm (c) 22 cm (d) 20 cm

54 A rectangular parallelepiped (cuboid) has length 8 cm, breadth 5 cm and height 3 cm. What is its total surface area?

SSC Phase-XIV (Matric) 17 Sep 2026, Shift-III

(a) 168 cm² (b) 158 cm² (c) 128 cm² (d) 138 cm²

55 The volume of a rectangular parallelepiped (cuboid) is 480 cm³. If its length and height are 12 cm and 8 cm respectively, what is its breadth?

SSC Phase-XIV (Matric) 18 Sep 2026, Shift-III

(a) 4 cm (b) 5 cm (c) 6 cm (d) 8 cm

56 The volume of a right circular cone is 400π cm³ and its height is 12 cm. What is the radius of its base?

SSC Phase-XIV (Matric) 18 Sep 2026, Shift-III

(a) 8 cm (b) 9 cm (c) 10 cm (d) 12 cm

57 A right circular cylinder is open at the top. Its radius is 14 cm and its height is 20 cm. It is made from a metal sheet using only the curved surface and one circular base. If the sheet costs Rs2 per 11 cm², what is the total cost of the sheet required? (Use $\pi = \frac{22}{7}$)

SSC Phase-XIV (Matric) 18 Sep 2026, Shift-III

(a) Rs396 (b) Rs420 (c) Rs432 (d) Rs448

58 A solid sphere of radius 7 cm is cut into two equal hemispheres. By how much does the total surface area increase? (Use $\pi = \frac{22}{7}$)

SSC Phase-XIV (Matric) 18 Sep 2026, Shift-III

(a) 154 cm² (b) 308 cm² (c) 616 cm² (d) 462 cm²

59 The volume of a cone is 1232 cm³ and its height is 24 cm. Using $\pi = \frac{22}{7}$, find the radius of the cone.

SSC Phase-XIV (Matric) 19 Sep 2026, Shift-III

(a) 6 cm (b) 8 cm (c) 9 cm (d) 7 cm

60 A metal rectangular parallelepiped (cuboid) of dimensions 9 cm × 8 cm × 6 cm is melted and cast into identical cubes of edge 2 cm. How many cubes can be made?

SSC Phase-XIV (Matric) 19 Sep 2026, Shift-III

(a) 54 (b) 59 (c) 40 (d) 58

61 If the dimensions of a rectangular parallelepiped are 10 cm, 7 cm and 4 cm, then its lateral surface area is:

SSC Phase-XIV (Matric) 21 Sep 2026, Shift-III

(a) 96 cm² (b) 112 cm² (c) 136 cm² (d) 140 cm²

62 The curved surface area of a right circular cone is 330π cm² and the radius of its base is 15 cm. What is the slant height of the cone?

SSC Phase-XIV (Matric) 21 Sep 2026, Shift-III

(a) 20 cm (b) 21 cm (c) 22 cm (d) 24 cm

63 A closed cylindrical tank of radius 14 cm is filled to 75% of its capacity. After 2310 cm³ of water is taken out, the remaining water is 60% of the full capacity of the tank. Find the height of the tank. (Take $\pi = \frac{22}{7}$)

SSC Phase-XIV (Matric) 21 Sep 2026, Shift-III

(a) 20 cm (b) 25 cm (c) 28 cm (d) 30 cm

64 The dimensions of a rectangular parallelepiped are 6 cm, 4 cm and 3 cm. What is its total surface area?

SSC Phase-XIV (Matric) 22 Sep 2026, Shift-III

(a) 96 cm² (b) 108 cm² (c) 84 cm² (d) 72 cm²

65 Two right circular cones are similar. If their radii are in the ratio 2 : 3, what is the ratio of their volumes?

SSC Phase-XIV (Matric) 22 Sep 2026, Shift-III

(a) 4:9 (b) 6:9 (c) 8:27 (d) 12:27

66 The radius of a right circular cylinder is increased by 20% and its height is decreased by 10%. What is the ratio of the new volume to the original volume?

SSC Phase-XIV (Matric) 22 Sep 2026, Shift-III

(a) 27:25 (b) 81:64 (c) 162:125 (d) 36:25

67 What is the difference between the total surface areas of two spheres of radii 14 cm and 7 cm? (Use $\pi = \frac{22}{7}$)

SSC Phase-XIV (Matric) 22 Sep 2026, Shift-III

(a) 1540 cm^2 (b) 1848 cm^2
(c) 1232 cm^2 (d) 462 cm^2

68 The volume of a conical tent is 1232 m^3 and the area of its base is 154 m^2. Using $\pi = \frac{22}{7}$, find the slant height of the tent.

SSC Phase-XIV (Matric) 23 Sep 2026, Shift-III

(a) 20 m (b) 25 m (c) 24 m (d) 26 m

69 A rectangular swimming pool is 25 m long and 12 m wide. If 360 m^3 of water is pumped into it, by how many metres will the water level rise?

SSC Phase-XIV (Matric) 23 Sep 2026, Shift-III

(a) 2.2 metres (b) 3.4 metres
(c) 1.2 metres (d) 2.5 metres

70 The length, breadth and height of a rectangular parallelepiped (cuboid) are 8 cm, 5 cm and 3 cm, respectively. What is its volume?

SSC Phase-XIV (Matric) 24 Sep 2026, Shift-III

(a) 120 cm^3 (b) 126 cm^3 (c) 128 cm^3 (d) 132 cm^3

71 The radius and height of a right circular cone are 7 cm and 15 cm, respectively. Using $\pi = \frac{22}{7}$, what is the volume of the cone?

SSC Phase-XIV (Matric) 24 Sep 2026, Shift-III

(a) 660 cm^3 (b) 770 cm^3 (c) 880 cm^3 (d) 990 cm^3

72 For a closed right circular cylinder, the difference between its total surface area and curved surface area is 308 cm^2. If $\pi = \frac{22}{7}$ and the height is 8 cm more than the radius, what is the volume of the cylinder?

SSC Phase-XIV (Matric) 24 Sep 2026, Shift-III

(a) 2156 cm^3 (b) 2310 cm^3
(c) 2464 cm^3 (d) 2640 cm^3

73 A hollow spherical shell has an external radius of 4 cm and an internal radius of 3 cm. What is the volume of the metal used?

SSC Phase-XIV (Matric) 24 Sep 2026, Shift-III

(a) $\left(\frac{148}{3}\right)\pi$ cm^3 (b) 36π cm^3
(c) 76π cm^3 (d) 84π cm^3

74 The height of a cylinder is 12 m. Three times the area of its two circular ends is equal to four times its curved surface area. Find its radius.

SSC Phase-XIV (Matric) 25 Sep 2026, Shift-III

(a) 16 m (b) 14 m (c) 15 m (d) 18 m

75 The curved surface area of a cone is 550 cm^2 and its radius is 7 cm. Using $\pi = \frac{22}{7}$, find the slant height.

SSC Phase-XIV (Matric) 25 Sep 2026, Shift-III

(a) 26 cm (b) 25 cm (c) 30 cm (d) 28 cm

76 If the total surface area of a sphere is 154 cm^2, what is its diameter? (Use $\pi = \frac{22}{7}$)

SSC Phase-XIV (Matric) 25 Sep 2026, Shift-III

(a) 3.5 cm (b) 7 cm (c) 10.5 cm (d) 14 cm

77 A rectangular parallelepiped (cuboid) has a square base. The height of the solid is three times the length of a side of its base. Find the ratio of its lateral surface area to its total surface area.

SSC Phase-XIV (Matric) 25 Sep 2026, Shift-III

(a) 2:3 (b) 6:7 (c) 4:5 (d) 7:8

Answer Key *SSC official key*

Mensuration (3D) (Q. 01–77)

01	(c)	02	(c)	03	(a)	04	(c)	05	(b)	06	(b)	07	(a)	08	(b)	09	(b)	10	(d)
11	(b)	12	(a)	13	(c)	14	(a)	15	(c)	16	(d)	17	(a)	18	(c)	19	(c)	20	(c)
21	(c)	22	(a)	23	(d)	24	(c)	25	(d)	26	(c)	27	(c)	28	(c)	29	(b)	30	(c)
31	(c)	32	(c)	33	(c)	34	(c)	35	(b)	36	(d)	37	(b)	38	(a)	39	(b)	40	(c)
41	(c)	42	(b)	43	(b)	44	(c)	45	(a)	46	(c)	47	(b)	48	(b)	49	(c)	50	(a)
51	(b)	52	(b)	53	(a)	54	(b)	55	(b)	56	(c)	57	(c)	58	(b)	59	(d)	60	(a)
61	(c)	62	(c)	63	(b)	64	(b)	65	(c)	66	(c)	67	(b)	68	(b)	69	(c)	70	(a)
71	(b)	72	(b)	73	(a)	74	(a)	75	(b)	76	(b)	77	(b)						

Detailed Explanations रटना बंद, समझना शुरू

Mensuration (3D)

01 **ANSWER (c)** 308 cm²

SSC Phase-XIV (Graduation) 17 Sep 2026, Shift-I

Formula: Hemisphere TSA $= 3\pi r^2$, CSA $= 2\pi r^2$

First get πr^2 from the TSA: $3\pi r^2 = 462 \Rightarrow \pi r^2 = 154$

Now CSA $= 2\pi r^2 = 2 \times 154 =$ **308 cm²**.

Short Trick The ratio of CSA to TSA is always 2 : 3. Directly, $\frac{2}{3} \times 462 = 308$. No need to find the radius at all.

02 **ANSWER (c)** 60°

SSC Phase-XIV (Graduation) 17 Sep 2026, Shift-I

Concept: Face-Base Angle $\cos\theta = \frac{a/2}{l}$ (a = side of base, l = slant height)

Area of the base $= a^2$ and area of one lateral face (a triangle) $= \frac{1}{2}al$.

The ratio given is 2 : 1, so $\frac{a^2}{\frac{1}{2}al} = 2 \Rightarrow \frac{2a}{l} = 2 \Rightarrow l = a$

Now $\cos\theta = \frac{a/2}{a} = \frac{1}{2} \Rightarrow \theta = 60°$, so the angle is **60°**.

03 **ANSWER (a)** 196.25 cm³

SSC Phase-XIV (Graduation) 18 Sep 2026, Shift-I

Formula: Cylinder Volume $V = \pi r^2 h$

Put the values straight in:
$V = 3.14 \times 2.5^2 \times 10 = 3.14 \times 62.5 = 196.25$, that is **196.25 cm³**.

04 **ANSWER (c)** 12 cm

SSC Phase-XIV (Graduation) 18 Sep 2026, Shift-I

Formula: Prism Volume Volume = Base area × Height

Area of the base $= 6 \times 4 = 24$ cm².

So height $= \frac{288}{24} = 12$ cm. The answer is **12 cm**.

05 **ANSWER (b)** 108 cm³

SSC Phase-XIV (Graduation) 18 Sep 2026, Shift-I

Formula: Pyramid Volume $V = \frac{1}{3} \times$ Base area $\times h$

The base is a square, so base area $= 6^2 = 36$ cm²

$V = \frac{1}{3} \times 36 \times 9 = 108$ cm³, which gives **108 cm³**.

06 **ANSWER (b)** 9 : 16

SSC Phase-XIV (Graduation) 19 Sep 2026, Shift-I

Concept: Similar Solids Volume $\propto r^3$, Area $\propto r^2$

The volume ratio is 27 : 64. Take the cube root: $r_1 : r_2 = 3 : 4$

TSA $= 3\pi r^2$, so it goes with r^2. The TSA ratio $= 3^2 : 4^2 =$ **9 : 16**.

Examiner's Trap If you take the cube root and stop at 3 : 4, you lose the mark. That is the ratio of the radii. The question asks for area, so you must

square it.

07 **ANSWER (a)** 400 cm^3

SSC Phase-XIV (Graduation) 19 Sep 2026, Shift-I

Formula: Square Pyramid LSA $= 2al$, $h = \sqrt{l^2 - (a/2)^2}$

First find the side. Diagonal $= a\sqrt{2} = 10\sqrt{2} \Rightarrow a = 10$ cm

Slant height from the LSA: $2 \times 10 \times l = 260 \Rightarrow l = 13$ cm

Now the vertical height $h = \sqrt{13^2 - 5^2} = \sqrt{144} = 12$ cm

$V = \frac{1}{3} \times 100 \times 12 = 400$, so the volume comes to **400 cm^3**.

Short Trick Remember the 5, 12, 13 triplet. When half the side is 5 and the slant height is 13, write the height as 12 straight away.

08 **ANSWER (b)** 227.5 cm^3

SSC Phase-XIV (Graduation) 21 Sep 2026, Shift-I

Formula: Prism Volume Volume = Base area × Height

The base area is given directly, so just multiply: $35 \times 6.5 = 227.5$, that is **227.5 cm^3**.

09 **ANSWER (b)** 14.88 m

SSC Phase-XIV (Graduation) 21 Sep 2026, Shift-I

Formula: Square Pyramid LSA $= \frac{1}{2} \times$ Perimeter $\times l$, $h = \sqrt{l^2 - (a/2)^2}$

The perimeter is 60, so side $a = \frac{60}{4} = 15$ m and half the side $= 7.5$ m

Find the slant height from the LSA: $\frac{1}{2} \times 60 \times l = 500 \Rightarrow l = \frac{50}{3} \approx 16.67$ m

Now $h = \sqrt{277.78 - 56.25} = \sqrt{221.53} \approx 14.88$ m. That makes (b) **14.88 m** correct.

Examiner's Trap 16.67 m is the slant height, not the vertical height. This value has been placed in the options on purpose. Don't pick it in a hurry.

10 **ANSWER (d)** 53 hours and 54 minutes

SSC Phase-XIV (Graduation) 22 Sep 2026, Shift-I

Formula: Hemisphere Volume $V = \frac{2}{3}\pi r^3$, 1 m^3 = 1000 litres

Volume of the tank: $V = \frac{2}{3} \times \frac{22}{7} \times 21^3 = \frac{2}{3} \times 22 \times 1323 = 19404$ m^3, that is 1,94,04,000 litres

The pump removes 100 litres every second, so time $= \frac{19404000}{100} = 194040$ seconds $= \frac{194040}{3600} = 53.9$ hours

Now convert 0.9 hour into minutes: $0.9 \times 60 = 54$ minutes. So the tank will be empty in **53 hours and 54 minutes**.

Examiner's Trap 53.9 hours does not mean 53 hours 9 minutes or 90 minutes. You must multiply the decimal part by 60.

11 **ANSWER (b)** 1:7

SSC Phase-XIV (Graduation) 22 Sep 2026, Shift-I

Concept: Similar Solids If the ratio of heights is k, the ratio of volumes is k^3

The small pyramid on top is similar to the whole pyramid, with $k = \frac{1}{2}$. So its volume is $\frac{1}{8}$ of the whole.

The remaining frustum $= 1 - \frac{1}{8} = \frac{7}{8}$ part. Ratio $= \frac{1}{8} : \frac{7}{8} =$ **1:7**.

Examiner's Trap 1:8 is the ratio of the small pyramid to the whole pyramid. The question compares it with the frustum, and this is exactly where students get caught.

12 **ANSWER (a)** 120 cm^2

SSC Phase-XIV (Graduation) 23 Sep 2026, Shift-I

Formula: Pyramid LSA LSA $= \frac{1}{2} \times$ Base perimeter × Slant height

Base perimeter $= 4 \times 6 = 24$ cm

LSA $= \frac{1}{2} \times 24 \times 10 = 120$, so the answer is **120 cm^2**.

13 **ANSWER (c)** 21.93 cm

SSC Phase-XIV (Graduation) 23 Sep 2026, Shift-I

Formula: Cuboid Diagonal $d = \sqrt{l^2 + b^2 + h^2}$

The longest support is the diagonal: $d = \sqrt{12^2 + 9^2 + 16^2} = \sqrt{144 + 81 + 256} = \sqrt{481}$

$21^2 = 441$ and $22^2 = 484$, so $\sqrt{481} \approx 21.93$ cm. The correct option is **21.93 cm**.

Short Trick 481 is very close to 484, which means the answer is a little less than 22. Among the

options, only 21.93 fits.

14 **ANSWER (a)** 154 cm²

SSC Phase-XIV (Graduation) 24 Sep 2026, Shift-I

Concept: TSA − CSA In a hemisphere, TSA − CSA $= 3\pi r^2 - 2\pi r^2 = \pi r^2$, which is just the flat circle on top

Difference $= \pi r^2 = \frac{22}{7} \times 49 =$ **154 cm²**.

15 **ANSWER (c)** 520 cm³

SSC Phase-XIV (Graduation) 24 Sep 2026, Shift-I

Concept: Similar Solids If the ratio of heights is k, the ratio of volumes is k^3

The small pyramid cut from the top is similar to the original pyramid, with $k = \frac{1}{3}$

Volume of the small pyramid $= \left(\frac{1}{3}\right)^3 \times 540 = 20$ cm³

The frustum left $= 540 - 20 = 520$, that is **520 cm³**.

16 **ANSWER (d)** 330 cm³

SSC Phase-XIV (Graduation) 25 Sep 2026, Shift-I

Formula: Prism Volume Volume = Base area × Height of prism

Note that two heights are given here. 5 cm belongs to the parallelogram, so base area $= 6 \times 5 = 30$ cm²

Now multiply by the prism height 11: $30 \times 11 = 330$, so the volume is **330 cm³**.

17 **ANSWER (a)** 12 cm

SSC Phase-XIV (Graduation) 25 Sep 2026, Shift-I

Formula: Pyramid LSA LSA $= \frac{1}{2} \times 4a \times l = 2al$

$2 \times a \times 13 = 312 \Rightarrow 26a = 312 \Rightarrow a = 12$, so the side is **12 cm**.

18 **ANSWER (c)** 348 cm²

SSC Phase-XIV (12th) 16 Sep 2026, Shift-II

Formula: Prism TSA TSA = Base perimeter × Height + 2 × Base area

First the lateral area: $30 \times 8 = 240$ cm²

Now add both bases, top and bottom: $240 + 2 \times 54 = 348$, that is **348 cm²**.

Examiner's Trap 240 is only the lateral area, and 294 adds the base just once. A prism has two ends, and both must be added.

19 **ANSWER (c)** 972 cm³

SSC Phase-XIV (12th) 16 Sep 2026, Shift-II

Formula: Cuboid Diagonal $d = \sqrt{l^2 + b^2 + h^2}$

Let the sides be $2k, 3k, 6k$. Then $d = \sqrt{4k^2 + 9k^2 + 36k^2} = 7k = 21 \Rightarrow k = 3$

So the sides are 6, 9 and 18 cm. Volume $= 6 \times 9 \times 18 = 972$, and the answer comes to **972 cm³**.

Short Trick Memorise the set 2, 3, 6, 7: $2^2 + 3^2 + 6^2 = 7^2$. When you see the ratio 2 : 3 : 6, the diagonal is simply 7k.

20 **ANSWER (c)** 384 cm²

SSC Phase-XIV (12th) 16 Sep 2026, Shift-II

Formula: Pyramid TSA TSA $= 2al + a^2$, $l = \sqrt{h^2 + (a/2)^2}$

First find the slant height: $l = \sqrt{8^2 + 6^2} = 10$ cm

LSA $= 2 \times 12 \times 10 = 240$ cm² and base $= 12^2 = 144$ cm²

TSA $= 240 + 144 =$ **384 cm²**.

Examiner's Trap If you take the vertical height 8 as the slant height, you get $2 \times 12 \times 8 + 144 = 336$, and that is sitting in option (b).

21 **ANSWER (c)** 486π cm³

SSC Phase-XIV (12th) 16 Sep 2026, Shift-II

Formula: Hemisphere Volume $V = \frac{2}{3}\pi r^3$

The bowl is full, so volume of water = volume of the bowl. $V = \frac{2}{3} \times \pi \times 9^3 = \frac{2}{3} \times 729\pi = 486\pi$ **cm³**.

22 **ANSWER (a)** 243.83 cm³

SSC Phase-XIV (12th) 17 Sep 2026, Shift-II

Formula: Cone + Hemisphere $V = \frac{1}{3}\pi r^2 h + \frac{2}{3}\pi r^3 = \frac{1}{3}\pi r^2 (h + 2r)$

Put in the values:

$V = \frac{1}{3} \times \frac{22}{7} \times 12.25 \times (12 + 7) = \frac{1}{3} \times 38.5 \times 19$

$= \frac{731.5}{3} \approx 243.83$ cm³ (cone 154 and hemisphere 89.83). So the total volume is **243.83 cm³**.

Short Trick When the cone and the hemisphere have the same radius, use $\frac{1}{3}\pi r^2(h+2r)$. No need for two separate calculations.

23 **ANSWER (d)** 2310 litres

SSC Phase-XIV (12th) 17 Sep 2026, Shift-II

Formula: Cylinder Volume $V=\pi r^2h$, 1 m^3 = 1000 litres

The diameter is 1.4 m, so the radius $=0.7$ m

$V=\frac{22}{7}\times0.49\times1.5=1.54\times1.5=2.31$ m^3

Convert to litres: $2.31\times1000=$ **2310 litres**.

Examiner's Trap If you take 1.4 itself as the radius, the volume becomes four times, that is 9240 litres. When you see a diameter, halve it first.

24 **ANSWER (c)** 216

SSC Phase-XIV (12th) 17 Sep 2026, Shift-II

Concept: Melt and Recast The volume stays the same. When spheres are made from a sphere, number $=\left(\frac{R}{r}\right)^3$

$\frac{R}{r}=\frac{4.2}{0.7}=6$, so the number $=6^3=$ **216**.

25 **ANSWER (d)** No change

SSC Phase-XIV (12th) 17 Sep 2026, Shift-II

Formula: Cylinder CSA CSA $=2\pi rh\propto r\times h$

New radius $=1.25r$ and new height $=0.8h$

New CSA $\propto 1.25\times0.8=1.00$, which means the CSA stays exactly as it was. The answer is **No change**.

Short Trick Use the successive change formula: $a+b+\frac{ab}{100}=25-20-\frac{500}{100}=0\%$. The change is zero.

26 **ANSWER (c)** 22 cm

SSC Phase-XIV (12th) 17 Sep 2026, Shift-II

Formula: Cone CSA CSA $=\pi rl$

$\pi\times10\times l=220\pi$, and π cancels from both sides. $l=22$, that is **22 cm**.

27 **ANSWER (c)** $360\sqrt{3}$ cm^3

SSC Phase-XIV (12th) 18 Sep 2026, Shift-II

Equilateral Triangle Area Area $=\frac{\sqrt{3}}{4}a^2$, and prism volume = Base × Height

Base area $=\frac{\sqrt{3}}{4}\times144=36\sqrt{3}$ cm^2

Volume $=36\sqrt{3}\times10$, which gives $360\sqrt{3}$ **cm^3**.

Examiner's Trap If you write $\frac{\sqrt{3}}{2}$ in place of $\frac{\sqrt{3}}{4}$, you get $720\sqrt{3}$. Option (d) is there exactly for this mistake.

28 **ANSWER (c)** 864 cm^3

SSC Phase-XIV (12th) 18 Sep 2026, Shift-II

Formula: Cuboid Volume $V=l\times b\times h$

$V=12\times9\times8=108\times8=864$ cm^3, straight away **864 cm^3**.

29 **ANSWER (b)** 324 cm^3

SSC Phase-XIV (12th) 18 Sep 2026, Shift-II

Formula: Pyramid Volume $V=\frac{1}{3}a^2h$

Base area $=9^2=81$ cm^2

$V=\frac{1}{3}\times81\times12=324$, so the volume is **324 cm^3**.

Examiner's Trap Forget the $\frac{1}{3}$ and you get 972, which is the volume of a prism. Remember, $\frac{1}{3}$ always applies in a pyramid and a cone.

30 **ANSWER (c)** 200π cm^2

SSC Phase-XIV (12th) 18 Sep 2026, Shift-II

Formula: Hemisphere CSA CSA $=2\pi r^2$

CSA $=2\pi\times10^2=200\pi$ **cm^2**.

Examiner's Trap The bowl is open at the top, so the circular top is not counted. $3\pi r^2=300\pi$ would be wrong here.

31 **ANSWER (c)** 882 cm^2

SSC Phase-XIV (12th) 19 Sep 2026, Shift-II

Formula: Prism TSA TSA = Base perimeter × Height + 2 × Base area

Lateral area $=4\times9\times20=720$ cm^2 and both bases together give $2\times81=162$ cm^2

TSA $=720+162=$ **882 cm^2**.

32 **ANSWER (c)** 248 cm²

SSC Phase-XIV (12th) 19 Sep 2026, Shift-II

Formula: Cuboid TSA TSA $= 2(lb + bh + hl)$

First add the three products:
$lb + bh + hl = 60 + 24 + 40 = 124$

Then double it: $2 \times 124 = 248$, that is **248 cm²**.

33 **ANSWER (c)** 260 cm²

SSC Phase-XIV (12th) 19 Sep 2026, Shift-II

Formula: Pyramid LSA LSA $= \frac{1}{2} \times$ Base perimeter $\times l$

Base perimeter $= 4 \times 10 = 40$ cm

LSA $= \frac{1}{2} \times 40 \times 13 = 260$, so the answer is **260 cm²**.

Examiner's Trap 130 covers only two faces, and 360 also adds the base area of 100. Lateral area includes only the four triangles.

34 **ANSWER (c)** 108π cm²

SSC Phase-XIV (12th) 19 Sep 2026, Shift-II

Formula: Hemisphere TSA In a closed (solid) hemisphere, both the curved top and the flat base are counted:
$2\pi r^2 + \pi r^2 = 3\pi r^2$

Here $r = 6$ cm, so $r^2 = 36$.

TSA $= 3\pi \times 36 = 108\pi$ cm². So the answer is 108π **cm²**.

Examiner's Trap Taking only the curved surface $2\pi r^2 = 72\pi$ and stopping at option (A). The question says 'closed', which means the base must be added too.

35 **ANSWER (b)** 21

SSC Phase-XIV (12th) 22 Sep 2026, Shift-II

Concept: Volume Transfer Number of bottles = Volume of cone ÷ Volume of one bottle

First find the volume of the cone:
$\frac{1}{3}\pi \times 10^2 \times 24 = 800\pi$ cm³.

Now one bottle: $\pi \times (2.5)^2 \times 6 = \pi \times 6.25 \times 6 = 37.5\pi$ cm³.

Number $= \frac{800\pi}{37.5\pi} = 21.33$. We count only completely filled bottles, so just **21** bottles get filled.

Short Trick π appears on top and bottom, so it cancels. Don't waste time multiplying by 3.14. Directly work out $\frac{800}{37.5}$.

36 **ANSWER (d)** 3:1

SSC Phase-XIV (12th) 22 Sep 2026, Shift-II

Formula: Cylinder and Cone Cylinder $= \pi r^2 h$, Cone $= \frac{1}{3}\pi r^2 h$

Both r and h are the same, so Cylinder : Cone $= \pi r^2 h : \frac{1}{3}\pi r^2 h = 1 : \frac{1}{3} = 3 : 1$.
The ratio comes out to **3:1**.

Examiner's Trap Watch the order. The question mentions the cylinder first, so the option 1:3 (Cone : Cylinder) is wrong.

37 **ANSWER (b)** 33.6 cm³

SSC Phase-XIV (12th) 22 Sep 2026, Shift-II

Formula: Hemisphere, Sphere Hemisphere TSA $= 3\pi R^2$, Volume of sphere $= \frac{4}{3}\pi r^3$

$3 \times 3.15 \times R^2 = 1360.8 \Rightarrow 9.45R^2 = 1360.8 \Rightarrow R^2 = 144$, so $R = 12$ cm.

The radius of the new sphere is $r = 12 - 10 = 2$ cm.

Volume $= \frac{4}{3} \times 3.15 \times 2^3 = 4.2 \times 8 =$ **33.6 cm³**.

38 **ANSWER (a)** 6 cm

SSC Phase-XIV (12th) 22 Sep 2026, Shift-II

Concept: Melting When solids are melted and recast, the total volume does not change: $R^3 = r_1^3 + r_2^3 + r_3^3$

$\frac{4}{3}\pi$ is in every term, so it cancels. What remains is $R^3 = 3^3 + 4^3 + 5^3 = 27 + 64 + 125 = 216$.

$R = \sqrt[3]{216} = 6$, so the radius of the new sphere is **6 cm**.

Short Trick Remember, $3^3 + 4^3 + 5^3 = 6^3$. This set comes up again and again in the exam. Write 6 the moment you see it.

39 **ANSWER (b)** 216π cm²

SSC Phase-XIV (12th) 22 Sep 2026, Shift-II

Formula: Cone TSA TSA $= \pi rl + \pi r^2 = \pi r(l + r)$

Put $r = 9$, $l = 15$: TSA $= \pi \times 9 \times (15 + 9) = 9 \times 24\pi = 216\pi$ cm².

The correct option is 216π **cm²**.

Examiner's Trap Taking only $\pi rl = 135\pi$ and picking option (A). The question asks for the 'total', so the base $\pi r^2 = 81\pi$ must be added too.

40 **ANSWER (c)** 360 cm³

SSC Phase-XIV (12th) 23 Sep 2026, Shift-II

Formula: Volume of Prism Volume = Area of base × Length

The base is a right-angled triangle. Its area $= \frac{1}{2} \times 6 \times 8 = 24$ cm².

Now multiply by the length: $24 \times 15 = 360$ cm³. So the answer is **360 cm³**.

Examiner's Trap If you forget the $\frac{1}{2}$, you get $6 \times 8 \times 15 = 720$. The area of a triangle is always half.

41 **ANSWER (c)** 26 cm

SSC Phase-XIV (12th) 23 Sep 2026, Shift-II

Formula: Cuboid Diagonal Longest rod in a room $= \sqrt{l^2 + b^2 + h^2}$

$\sqrt{6^2 + 8^2 + 24^2} = \sqrt{36 + 64 + 576} = \sqrt{676} = 26$

So the length of the rod is **26 cm**.

Short Trick 6 and 8 give 10 (6-8-10 triplet), then 10 and 24 give 26 (10-24-26 triplet). The answer is in front of you without any calculation.

42 **ANSWER (b)** $12\sqrt{3}$ cm³

SSC Phase-XIV (12th) 23 Sep 2026, Shift-II

Formula: Pyramid Volume Volume $= \frac{1}{3} \times$ Base area × Height

The base is an equilateral triangle: $\frac{\sqrt{3}}{4} \times 6^2 = 9\sqrt{3}$ cm².

Volume $= \frac{1}{3} \times 9\sqrt{3} \times 4 = 12\sqrt{3}$ cm³.

That makes $12\sqrt{3}$ **cm³** the right option.

Examiner's Trap Miss the $\frac{1}{3}$ and you get $36\sqrt{3}$ (option D). That is the volume of a prism, not a pyramid.

43 **ANSWER (b)** 98π cm²

SSC Phase-XIV (12th) 23 Sep 2026, Shift-II

Formula: Hemisphere CSA Curved surface area of a hemisphere $= 2\pi r^2$

$r = 7$, so CSA $= 2\pi \times 49 = 98\pi$ **cm²**.

Examiner's Trap Reading the word 'solid' and taking $3\pi r^2 = 147\pi$. The question asks only for the curved surface, not the base.

44 **ANSWER (c)** Rs46,200

SSC Phase-XIV (12th) 25 Sep 2026, Shift-II

Formula: Cone CSA $l = \sqrt{r^2 + h^2}$, Curved surface $= \pi rl$

First the slant height: $l = \sqrt{7^2 + 24^2} = \sqrt{625} = 25$ m.

Curved surface $= \frac{22}{7} \times 7 \times 25 = 550$ m².

At ₹84 per m², cost $= 550 \times 84 = 46200$, that is **Rs46,200**.

45 **ANSWER (a)** 1:2

SSC Phase-XIV (12th) 25 Sep 2026, Shift-II

Formula: Cone and Sphere Cone $= \frac{1}{3}\pi r^2 h$, Sphere $= \frac{4}{3}\pi r^3$

Set the two volumes equal: $\frac{1}{3}\pi r^2 h = \frac{4}{3}\pi r^3 \Rightarrow h = 4r$.

Diameter of the sphere $= 2r$, so Diameter : Height $= 2r : 4r = 1 : 2$.

Answer: **1:2**.

Examiner's Trap The question asks for the diameter, not the radius. Writing $r : 4r = 1 : 4$ is wrong. And don't reverse the order to pick 2:1 either.

46 **ANSWER (c)** 170π cm²

SSC Phase-XIV (12th) 25 Sep 2026, Shift-II

Formula: Cylinder TSA TSA of a closed cylinder $= 2\pi r(r + h)$

TSA $= 2\pi \times 5 \times (5 + 12) = 10\pi \times 17 = 170\pi$ cm².

So making the tin needs 170π **cm²** of sheet.

Examiner's Trap Taking only $2\pi rh = 120\pi$ (option A). The tin is 'closed', so both lids $2\pi r^2 = 50\pi$ get added too.

47 **ANSWER (b)** 168π cm³

SSC Phase-XIV (12th) 25 Sep 2026, Shift-II

Formula: Cone Volume $V = \frac{1}{3}\pi r^2 h$

$V = \frac{1}{3}\pi \times 36 \times 14 = 12 \times 14\pi = 168\pi$ **cm³**.

Examiner's Trap Forget the $\frac{1}{3}$ and you get 504π, which is the volume of the cylinder.

48 **ANSWER (b)** 162π cm²

SSC Phase-XIV (12th) 25 Sep 2026, Shift-II

Formula: Hemisphere Volume $=\frac{2}{3}\pi r^3$, Curved surface $=2\pi r^2$

Get the radius from the volume:
$\frac{2}{3}\pi r^3 = 486\pi \Rightarrow r^3 = 729 \Rightarrow r = 9$ cm.

Now curved surface $= 2\pi \times 81 = 162\pi$ cm². The correct option is 162π **cm²**.

49 **ANSWER (c)** 240 cm³

SSC Phase-XIV (Matric) 16 Sep 2026, Shift-III

Concept: Increase in Volume If only the length increases, increase = (increase in length) $\times b \times h$

Original volume $= 15 \times 10 \times 8 = 1200$ cm³. New volume $= 18 \times 10 \times 8 = 1440$ cm³.

Increase $= 1440 - 1200 = 240$ cm³, that is **240 cm³**.

Short Trick Just do $3 \times 10 \times 8 = 240$. There is no need to find both full volumes.

50 **ANSWER (a)** 75 cm

SSC Phase-XIV (Matric) 16 Sep 2026, Shift-III

Formula: Slant Height $l = \sqrt{r^2 + h^2}$

$l = \sqrt{21^2 + 72^2} = \sqrt{441 + 5184} = \sqrt{5625} = 75$
The slant height is **75 cm**.

Short Trick 21 : 72 is really 3 × (7 : 24), and 7-24-25 is a triplet. So $l = 3 \times 25 = 75$, that's it.

51 **ANSWER (b)** 4 cm

SSC Phase-XIV (Matric) 16 Sep 2026, Shift-III

Concept: Melting Volume of the original solid = total volume of all the new solids

Original cylinder: $\pi \times 8^2 \times 9 = 576\pi$ cm³.

The 4 new cylinders together: $4 \times \pi \times 6^2 \times h = 144\pi h$.

Equating them, $144\pi h = 576\pi \Rightarrow h = 4$. So each new cylinder is **4 cm** tall.

52 **ANSWER (b)** 7 cm

SSC Phase-XIV (Matric) 16 Sep 2026, Shift-III

Formula: Sphere Surface Surface area of a sphere $= 4\pi r^2$

The radius goes up by 50%, so the new radius $= 1.5r$. New surface $= 4\pi(1.5r)^2 = 4\pi \times 2.25r^2 = 9\pi r^2$.

Increase $= 9\pi r^2 - 4\pi r^2 = 5\pi r^2 = 770$.

$r^2 = \frac{770 \times 7}{5 \times 22} = 49 \Rightarrow r = 7$, so the original radius is **7 cm**.

Short Trick Check from the options: at $r = 7$, $4\pi r^2 = 616$. An increase of 125% $= 616 \times 1.25 = 770$ ✓

53 **ANSWER (a)** 24 cm

SSC Phase-XIV (Matric) 17 Sep 2026, Shift-III

Formula: Height $h = \sqrt{l^2 - r^2}$

$h = \sqrt{25^2 - 7^2} = \sqrt{625 - 49} = \sqrt{576} =$ **24 cm**. (Spot the 7-24-25 triplet and you get 24 straight away.)

54 **ANSWER (b)** 158 cm²

SSC Phase-XIV (Matric) 17 Sep 2026, Shift-III

Formula: Cuboid TSA TSA $= 2(lb + bh + hl)$

$lb = 40$, $bh = 15$, $hl = 24$, and their sum $= 79$.

TSA $= 2 \times 79 = 158$. So the total surface area comes to **158 cm²**.

55 **ANSWER (b)** 5 cm

SSC Phase-XIV (Matric) 18 Sep 2026, Shift-III

Formula: Cuboid Volume $V = l \times b \times h$

$480 = 12 \times b \times 8 = 96b$, so $b = \frac{480}{96} = 5$
Breadth: **5 cm**.

56 **ANSWER (c)** 10 cm

SSC Phase-XIV (Matric) 18 Sep 2026, Shift-III

Formula: Cone Volume $V = \frac{1}{3}\pi r^2 h$

Put $h = 12$: $\frac{1}{3}\pi r^2 \times 12 = 400\pi \Rightarrow 4r^2 = 400$.

$r^2 = 100 \Rightarrow r = 10$. So the radius is **10 cm**.

57 **ANSWER (c)** Rs432

SSC Phase-XIV (Matric) 18 Sep 2026, Shift-III

Formula: Open Cylinder The vessel is open at the top, so there is only one base: Sheet $= 2\pi rh + \pi r^2 = \pi r(2h + r)$

Sheet $= \frac{22}{7} \times 14 \times (40 + 14) = 44 \times 54 = 2376$ cm².

The rate is ₹2 per 11 cm²: $\frac{2376}{11} \times 2 = 216 \times 2 = 432$. So the cost is **Rs432**.

Examiner's Trap The rate is ₹2 for every 11 cm², not for every cm². Do 2376×2 and you will land straight on a wrong option.

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58 ANSWER (b) 308 cm²

SSC Phase-XIV (Matric) 18 Sep 2026, Shift-III

Concept: Faces on Cutting When a sphere is cut into two parts, two new flat circular faces are formed: increase $= 2\pi r^2$

Each hemisphere gets one new circle πr^2. Together that makes $2\pi r^2$.

Increase $= 2 \times \frac{22}{7} \times 49 =$ **308 cm²**.

Examiner's Trap Counting only one circle ($\pi r^2 = 154$). Cutting creates one new face on each of the two pieces.

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59 ANSWER (d) 7 cm

SSC Phase-XIV (Matric) 19 Sep 2026, Shift-III

Formula: Cone Volume $V = \frac{1}{3}\pi r^2 h$

$\frac{1}{3} \times \frac{22}{7} \times r^2 \times 24 = 1232 \Rightarrow \frac{176}{7} r^2 = 1232$

$r^2 = \frac{1232 \times 7}{176} = 7 \times 7 = 49$, so $r = 7$.

The radius works out to **7 cm**.

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60 ANSWER (a) 54

SSC Phase-XIV (Matric) 19 Sep 2026, Shift-III

Concept: Melting Number of cubes = Volume of cuboid ÷ Volume of one cube

Volume of the cuboid $= 9 \times 8 \times 6 = 432$ cm³. One cube $= 2^3 = 8$ cm³.

Number $= \frac{432}{8} = 54$. So **54** cubes can be made.

Examiner's Trap The question says 'melted', so divide by volume. If you cut it without melting, whole 2 cm cubes would not fit along 9 cm, and you would get only 48.

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61 ANSWER (c) 136 cm²

SSC Phase-XIV (Matric) 21 Sep 2026, Shift-III

Formula: Cuboid LSA Area of the four walls (lateral surface) $= 2h(l + b)$

Put $l = 10$, $b = 7$, $h = 4$: LSA $= 2 \times 4 \times (10 + 7) = 8 \times 17 = 136$.

So the answer is **136 cm²**.

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62 ANSWER (c) 22 cm

SSC Phase-XIV (Matric) 21 Sep 2026, Shift-III

Formula: Cone CSA Curved surface $= \pi rl$

$\pi \times 15 \times l = 330\pi$. π cancels, so $l = \frac{330}{15} = 22$. Slant height: **22 cm**.

---

63 ANSWER (b) 25 cm

SSC Phase-XIV (Matric) 21 Sep 2026, Shift-III

Formula: Cylinder Volume $V = \pi r^2 h$

The tank went from 75% to 60%, so water taken out $= (75\% - 60\%) = 15\%$ of capacity $= 2310$ cm³.

Full capacity $V = \frac{2310 \times 100}{15} = 15400$ cm³.

Now $\frac{22}{7} \times 196 \times h = 616h = 15400 \Rightarrow h = 25$

The height is **25 cm**.

---

64 ANSWER (b) 108 cm²

SSC Phase-XIV (Matric) 22 Sep 2026, Shift-III

Formula: Cuboid TSA TSA $= 2(lb + bh + hl)$

$lb = 24$, $bh = 12$, $hl = 18$, sum $= 54$.

TSA $= 2 \times 54 =$ **108 cm²**.

Examiner's Trap $6 \times 4 \times 3 = 72$ is the volume, not the surface area. Option (D) is there to catch exactly this mistake.

---

65 ANSWER (c) 8:27

SSC Phase-XIV (Matric) 22 Sep 2026, Shift-III

Rule: Similar Solids For similar solids, ratio of volumes = (ratio of linear measures)^3

They are similar, so $h_1 : h_2 = r_1 : r_2 = 2 : 3$.

Volume ratio $= \left(\frac{2}{3}\right)^3 = \frac{8}{27}$, which means **8:27**.

Examiner's Trap Squaring only the radius and

choosing 4:9. In similar cones the height also changes in the same ratio, so you must take the cube.

66 ANSWER (c) 162:125

SSC Phase-XIV (Matric) 22 Sep 2026, Shift-III

Formula: Cylinder Volume $V=\pi r^2h$, that is $V\propto r^2h$

Radius up 20% and height down 10%: new radius $=\frac{6}{5}r$, new height $=\frac{9}{10}h$.

Volume factor $=\left(\frac{6}{5}\right)^2\times\frac{9}{10}=\frac{36}{25}\times\frac{9}{10}=\frac{324}{250}=\frac{162}{125}$

So New : Original = **162:125**.

Examiner's Trap Forgetting to square the radius, or stopping at $\frac{36}{25}$ (option D). The 10% fall in height has to be applied too.

67 ANSWER (b) 1848 cm²

SSC Phase-XIV (Matric) 22 Sep 2026, Shift-III

Formula: Sphere Surface Surface area of a sphere $=4\pi r^2$

Difference
$=4\pi(14^2-7^2)=4\pi(196-49)=4\pi\times147=588\pi$

$588\times\frac{22}{7}=84\times22=1848$ cm². The difference is **1848 cm²**.

Short Trick Surface of the smaller sphere $4\pi\times49=616$. Double the radius and the surface becomes four times $=2464$. Difference $=3\times616=1848$.

68 ANSWER (b) 25 m

SSC Phase-XIV (Matric) 23 Sep 2026, Shift-III

Formula: Cone Volume $=\frac{1}{3}\times$ base area $\times h$ and slant height $l=\sqrt{r^2+h^2}$

First find the radius. $\pi r^2=154\Rightarrow r^2=154\times\frac{7}{22}=49$, so $r=7$ m.

Now get the height from the volume:
$\frac{1}{3}\times154\times h=1232\Rightarrow h=\frac{1232\times3}{154}=24$ m.

$l=\sqrt{7^2+24^2}=\sqrt{625}=25$ m.
So the slant height comes out to **25 m**.

Short Trick 7, 24, 25 is a Pythagorean triplet. The moment you see $r=7$ and $h=24$, write $l=25$ straight away.

69 ANSWER (c) 1.2 metres

SSC Phase-XIV (Matric) 23 Sep 2026, Shift-III

Concept: Volume Volume of water = base area × height of water level

Base area of the pool $=25\times12=300$ m².

The 360 m³ of water spreads over this 300 m², so the rise in water level $=\frac{360}{300}=1.2$ m.
Answer: **1.2 metres**.

70 ANSWER (a) 120 cm³

SSC Phase-XIV (Matric) 24 Sep 2026, Shift-III

Formula: Cuboid Volume $=l\times b\times h$

Just multiply: $8\times5\times3=40\times3=120$ cm³.
That is **120 cm³**.

71 ANSWER (b) 770 cm³

SSC Phase-XIV (Matric) 24 Sep 2026, Shift-III

Formula: Volume of Cone $V=\frac{1}{3}\pi r^2h$

Put in the values: $V=\frac{1}{3}\times\frac{22}{7}\times7\times7\times15$

One 7 cancels, and 15 divided by 3 leaves 5. So $V=22\times7\times5=770$ cm³, which makes **770 cm³** the correct option.

72 ANSWER (b) 2310 cm³

SSC Phase-XIV (Matric) 24 Sep 2026, Shift-III

Formula: Cylinder TSA − CSA $=2\pi r^2$ (both circular ends), volume $=\pi r^2h$

The difference between TSA and CSA is the area of the two ends. $2\pi r^2=308\Rightarrow r^2=\frac{308\times7}{44}=49$, so $r=7$ cm.

The height is 8 more than the radius, so $h=7+8=15$ cm.

Volume $=\frac{22}{7}\times49\times15=154\times15=2310$ cm³.
So the answer is **2310 cm³**.

Examiner's Trap Many students take the difference as just πr^2 (one end). Then $r^2=98$, which is not even a perfect square. A closed cylinder has two ends, so you must take $2\pi r^2$.

73 **ANSWER (a)** $\left(\frac{148}{3}\right)\pi$ cm³

SSC Phase-XIV (Matric) 24 Sep 2026, Shift-III

Formula: Hollow Sphere Volume of metal $=\frac{4}{3}\pi(R^3-r^3)$

Here $R=4$ and $r=3$. $R^3-r^3=64-27=37$.

Volume $=\frac{4}{3}\pi\times37=\frac{148}{3}\pi$ cm³, that is $\left(\frac{148}{3}\right)\pi$ **cm³**.

Examiner's Trap If you use $\frac{4}{3}\pi(R-r)^3$ or $\frac{4}{3}\pi(R^2-r^2)$, you will land on a wrong option. Remember, take the difference of the cubes, not the cube of the difference.

74 **ANSWER (a)** 16 m

SSC Phase-XIV (Matric) 25 Sep 2026, Shift-III

Formula: Cylinder Area of both ends $=2\pi r^2$, curved surface $=2\pi rh$

Write the given condition: $3\times2\pi r^2=4\times2\pi rh$

$2\pi r$ cancels from both sides: $3r=4h=4\times12=48$.
So the radius $r=16$ m, that is **16 m**.

75 **ANSWER (b)** 25 cm

SSC Phase-XIV (Matric) 25 Sep 2026, Shift-III

Formula: CSA of Cone Curved surface $=\pi rl$

$\frac{22}{7}\times7\times l=550\Rightarrow22l=550$, so $l=\frac{550}{22}=25$ cm.
Slant height is **25 cm**.

76 **ANSWER (b)** 7 cm

SSC Phase-XIV (Matric) 25 Sep 2026, Shift-III

Formula: Sphere Surface Surface area $=4\pi r^2=\pi d^2$

The question asks for the diameter, so we write it directly in terms of d (from $d=2r$, $4\pi r^2=\pi d^2$). So $\frac{22}{7}d^2=154$

$d^2=154\times\frac{7}{22}=49\Rightarrow d=7$ cm.
The correct option is **7 cm**.

Examiner's Trap If you find $r=3.5$ cm and stop there, you will tick option (A). The question asks for the diameter, not the radius.

77 **ANSWER (b)** 6:7

SSC Phase-XIV (Matric) 25 Sep 2026, Shift-III

Formula: Cuboid Lateral surface $=2h(l+b)$, total surface = lateral $+2lb$

Let the side of the base be a and the height $3a$.
Lateral surface $=2\times3a\times(a+a)=12a^2$

For the total surface, add the top and bottom faces: $12a^2+2a^2=14a^2$

Ratio $=12a^2:14a^2=6:7$, that is **6:7**.

Short Trick Put $a=1$. Four side faces, each 1×3, give 12. The top and bottom faces give 2. Ratio 12 : 14 = 6 : 7.

TOPPERS' WISDOM
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23 CHAPTER
Trigonometry

Questions *39 questions · 16 shifts*

Trigonometry

Directions (Q. 01–39): *Choose the correct answer from the four given options.*

01 Simplify:
$(\sin A + \text{cosec}A)^2 + (\cos A + \sec A)^2 - (\tan^2 A + \cot^2 A)$

SSC Phase-XIV (Graduation) 17 Sep 2026, Shift-I

(a) 0 (b) 7 (c) 1 (d) 5

02 Simplify the expression:
$(\sin\theta + \text{cosec}\theta)^2 + (\cos\theta + \sec\theta)^2 - (\tan\theta + \cot\theta)^2$

SSC Phase-XIV (Graduation) 17 Sep 2026, Shift-I

(a) 5 (b) 0 (c) 1 (d) $\frac{1}{2}$

03 If $\sin\theta - \cos\theta = \frac{4}{5}$, find the value of $\sin\theta + \cos\theta$.

SSC Phase-XIV (Graduation) 17 Sep 2026, Shift-I

(a) $\frac{\sqrt{34}}{5}$ (b) $\frac{5}{\sqrt{34}}$ (c) $\frac{\sqrt{24}}{5}$ (d) $\frac{5}{\sqrt{24}}$

04 If $\sec^2\theta + \tan^2\theta = \frac{7}{12}$, find the value of $\sec^4\theta - \tan^4\theta$.

SSC Phase-XIV (Graduation) 17 Sep 2026, Shift-I

(a) $\frac{7}{12}$ (b) $\frac{13}{12}$ (c) 1 (d) $\frac{5}{12}$

05 If $3\sin\theta + 5\cos\theta = 5$, find the value of $5\sin\theta - 3\cos\theta$.

SSC Phase-XIV (Graduation) 19 Sep 2026, Shift-I

(a) 0 (b) ±1 (c) ±3 (d) ±5

06 What is the value of
$\frac{\sin(18^\circ)\cos(72^\circ) + \sec(61^\circ)\sin(29^\circ) + \cos(18^\circ)\sin(72^\circ) + \csc(61^\circ)\cos(29^\circ)}{\sec^2(48^\circ) - \cot^2(42^\circ)}$?

SSC Phase-XIV (Graduation) 19 Sep 2026, Shift-I

(a) 0 (b) 1 (c) 2 (d) 3

07 If $\csc\theta + \cot\theta = p$, find the value of $\frac{p^2-1}{p^2+1}$.

SSC Phase-XIV (Graduation) 19 Sep 2026, Shift-I

(a) $\sin\theta$ (b) $\tan\theta$ (c) $\cos\theta$ (d) $\cot\theta$

08 Find the value of the expression:
$3(\sin\theta - \cos\theta)^4 + 6(\sin\theta + \cos\theta)^2 + 4(\sin^6\theta + \cos^6\theta)$

SSC Phase-XIV (Graduation) 19 Sep 2026, Shift-I

(a) 1 (b) 7 (c) 13 (d) 10

09 How many degrees are there in $\frac{5\pi}{3}$ radians?

SSC Phase-XIV (Graduation) 21 Sep 2026, Shift-I

(a) 300° (b) 200° (c) 400° (d) 100°

10 If $\text{cosec}\theta - \cot\theta = \sqrt{2} - 1$, find the value of $\text{cosec}\theta + \cot\theta$.

SSC Phase-XIV (Graduation) 22 Sep 2026, Shift-I

(a) 0 (b) $\sqrt{2}$ (c) $\sqrt{2}+2$ (d) $\sqrt{2}+1$

11 If $\sin\theta - \cos\theta = \frac{3}{5}$, find the value of $\sin\theta + \cos\theta$.

SSC Phase-XIV (Graduation) 22 Sep 2026, Shift-I

(a) $\frac{\sqrt{31}}{5}$ (b) $\frac{5}{\sqrt{41}}$ (c) $\frac{\sqrt{41}}{5}$ (d) $\frac{5}{\sqrt{31}}$

12 What is the value of
$\frac{2[\sin(21^\circ)\cos(69^\circ) + \cos(21^\circ)\sin(69^\circ)] + 3\sec(54^\circ)\sin(36^\circ)}{\text{cosec}^2(15^\circ) - \tan^2(75^\circ)}$?

SSC Phase-XIV (Graduation) 22 Sep 2026, Shift-I

(a) 1 (b) 2 (c) 4 (d) 5

13 Simplify the expression $\frac{\tan\theta - \sec\theta + 1}{\tan\theta + \sec\theta - 1}$.

SSC Phase-XIV (Graduation) 22 Sep 2026, Shift-I

(a) $\frac{\sin\theta + \cos\theta + 1}{\sin\theta}$ (b) 0

(c) 1 (d) $\frac{1-\sin\theta}{\cos\theta}$

14 Convert -390° into radians.

SSC Phase-XIV (Graduation) 23 Sep 2026, Shift-I

(a) $-\frac{13\pi}{6}$ (b) $-\frac{11\pi}{6}$ (c) $-\frac{7\pi}{6}$ (d) $-\frac{15\pi}{6}$

15 If $\sin\theta+\sin^3\theta=\cos^2\theta$, find the value of $\cos^6\theta-4\cos^4\theta+8\cos^2\theta$.

SSC Phase-XIV (Graduation) 24 Sep 2026, Shift-I

(a) 4 (b) 1 (c) 0 (d) -2

16 If $\sin A+\cos A=\sqrt{2}$, find the value of $\tan A+\cot A$.

SSC Phase-XIV (Graduation) 24 Sep 2026, Shift-I

(a) 2 (b) 1 (c) $\sqrt{2}$ (d) $\frac{1}{\sqrt{2}}$

17 What is the value of $\frac{\sin(42^\circ)\sec(48^\circ)+\cos(42^\circ)\operatorname{cosec}(48^\circ)+\tan(38^\circ)\tan(52^\circ)}{\operatorname{cosec}^2(31^\circ)-\tan^2(59^\circ)}$?

SSC Phase-XIV (Graduation) 24 Sep 2026, Shift-I

(a) 0 (b) 1 (c) 2 (d) 3

18 Simplify the expression: $\frac{\cos^3\theta+\sin^3\theta}{\cos\theta+\sin\theta}+\frac{\cos^3\theta-\sin^3\theta}{\cos\theta-\sin\theta}$

SSC Phase-XIV (Graduation) 24 Sep 2026, Shift-I

(a) 1 (b) 0 (c) 2 (d) -2

19 Without using decimal values, find the value of: $\sin 18^\circ\cdot\sec 72^\circ+\cos 18^\circ\cdot\operatorname{csc} 72^\circ+\tan 35^\circ\cdot\cot 35^\circ$.

SSC Phase-XIV (12th) 16 Sep 2026, Shift-II

(a) 1 (b) 2 (c) 3 (d) 4

20 If $\sin\theta+\cos\theta=1$, then the value of $\sin\theta\cos\theta$ is:

SSC Phase-XIV (12th) 16 Sep 2026, Shift-II

(a) 0 (b) $\frac{1}{2}$ (c) $-\frac{1}{2}$ (d) 1

21 If $\tan A+\tan^2 A=1$, find the value of $\cot^2 A-\cot A$.

SSC Phase-XIV (12th) 16 Sep 2026, Shift-II

(a) 0 (b) 1 (c) 2 (d) -1

22 If $\tan\theta=3/4$, then what is $(\sin\theta+\cos\theta)/(\sin\theta-\cos\theta)$?

SSC Phase-XIV (12th) 17 Sep 2026, Shift-II

(a) (-5) (b) (-7) (c) 0 (d) (-8)

23 If $\sin\theta\cos\theta=\frac{1}{3}$, find the value of $\sin^4\theta+\cos^4\theta$.

SSC Phase-XIV (12th) 18 Sep 2026, Shift-II

(a) 7/9 (b) 8/9 (c) 1/9 (d) 2/9

24 If α and β are acute angles, $\alpha+\beta=60^\circ$ and $\tan\alpha\tan\beta=\frac{1}{3}$, find the value of $\tan\alpha+\tan\beta$.

SSC Phase-XIV (12th) 18 Sep 2026, Shift-II

(a) $\frac{\sqrt{3}}{3}$ (b) $\frac{2\sqrt{3}}{3}$ (c) $\sqrt{3}$ (d) $\frac{4\sqrt{3}}{3}$

25 If $\sec(7\theta-11^\circ)=\operatorname{csc}(4\theta+2^\circ)$, where both angles are acute, then θ is equal to:

SSC Phase-XIV (12th) 19 Sep 2026, Shift-II

(a) 7° (b) 8° (c) 9° (d) 10°

26 If $\sin^2\theta=\frac{9}{25}$ and $\cos\theta$ is positive, then the value of $\sin^2\theta+\cos^2\theta$ is:

SSC Phase-XIV (12th) 19 Sep 2026, Shift-II

(a) $\frac{9}{25}$ (b) $\frac{16}{25}$ (c) 1 (d) $\frac{25}{16}$

27 Simplify: $(\csc A-\cot A)^2+(\csc A+\cot A)^2-4\cot^2 A$.

SSC Phase-XIV (12th) 19 Sep 2026, Shift-II

(a) 0 (b) 1 (c) 2 (d) 4

28 If $\sin A=\frac{1}{2}$, then the value of $\cot A$ is

SSC Phase-XIV (12th) 21 Sep 2026, Shift-II

(a) $\sqrt{3}$ (b) $\frac{1}{\sqrt{3}}$ (c) $\frac{\sqrt{3}}{2}$ (d) 1

29 If $p+q=90^\circ$ and all the terms are defined, find the value of:

$[\operatorname{cosec} p-\sec q]^{10}+[\cot p-\tan q]^6+[\sin^2 p+\sin^2 q][\cos^2 p+\cos^2 q]$

SSC Phase-XIV (12th) 21 Sep 2026, Shift-II

(a) 0 (b) 1 (c) 2 (d) 3

30 If θ is an acute angle and $2\sin\theta+3\cos\theta=\sqrt{13}$, find $\tan\theta$.

SSC Phase-XIV (12th) 22 Sep 2026, Shift-II

(a) 2/3 (b) 3/2 (c) $\frac{\sqrt{13}}{3}$ (d) $\frac{3}{\sqrt{13}}$

31 If θ is an acute angle and $\sin(\theta+22^\circ)=\cos(3\theta-8^\circ)$, find θ.

SSC Phase-XIV (12th) 23 Sep 2026, Shift-II

(a) 17° (b) 18° (c) 19° (d) 21°

32 Simplify: $\frac{(1-\sin^2\theta)}{\cos^2\theta}$

SSC Phase-XIV (12th) 23 Sep 2026, Shift-II

(a) $\sin^2\theta$ (b) $\cos^2\theta$ (c) 1 (d) $\tan^2\theta$

33 Simplify: $\frac{\text{cosec}\,A}{(\text{cosec}\,A-1)}+\frac{\text{cosec}\,A}{(\text{cosec}\,A+1)}$

SSC Phase-XIV (12th) 23 Sep 2026, Shift-II

(a) $2\sec^2 A$ (b) $2\,\text{cosec}^2 A$
(c) $2\tan^2 A$ (d) $2\cot^2 A$

34 Find the value of:
$\sin^2 18^\circ+\sin^2 72^\circ+\cos^2 36^\circ+\cos^2 54^\circ+\tan 15^\circ\tan 75^\circ$.

SSC Phase-XIV (12th) 24 Sep 2026, Shift-II

(a) 2 (b) 52 (c) 3 (d) 4

35 If $\sin\theta+\cos\theta=\sqrt{2}$, find the value of $\tan\theta+\cot\theta$.

SSC Phase-XIV (12th) 24 Sep 2026, Shift-II

(a) 3 (b) 4 (c) 5 (d) 2

36 If $X^\circ 48'$ is equal to $\frac{719\pi}{900}$ radians, find the value of X.

SSC Phase-XIV (12th) 25 Sep 2026, Shift-II

(a) 142 (b) 143 (c) 144 (d) 145

37 If θ is an acute angle and $\text{cosec}\,\theta+\cot\theta=4$, find $\cos\theta$.

SSC Phase-XIV (12th) 25 Sep 2026, Shift-II

(a) 8/17 (b) 15/17 (c) 17/15 (d) 17/8

38 A ladder rests against a wall, making an angle of 28° with the ground. To calculate stability, the engineer needs the complementary angle.
Find the complementary angle.

SSC Phase-XIV (12th) 26 Sep 2026, Shift-I

(a) 46° (b) 54° (c) 56° (d) 62°

39 If $\sin\theta+\cos\theta=\frac{7}{9}$, find the value of $\tan^2\theta+\cot^2\theta$.

SSC Phase-XIV (12th) 26 Sep 2026, Shift-I

(a) 5 (b) 6
(c) 6049/256 (d) 8

Answer Key *SSC official key*

Trigonometry (Q. 01–39)

01	(b)	02	(a)	03	(a)	04	(a)	05	(c)	06	(d)	07	(c)	08	(c)	09	(a)	10	(d)
11	(c)	12	(d)	13	(d)	14	(a)	15	(a)	16	(a)	17	(d)	18	(c)	19	(c)	20	(a)
21	(b)	22	(b)	23	(a)	24	(b)	25	(c)	26	(c)	27	(c)	28	(a)	29	(b)	30	(a)
31	(c)	32	(c)	33	(a)	34	(c)	35	(d)	36	(b)	37	(b)	38	(d)	39	(c)		

Detailed Explanations रटना बंद, समझना शुरू

Trigonometry

01 ANSWER (b) 7

SSC Phase-XIV (Graduation) 17 Sep 2026, Shift-I

Identity $\sin A\cdot\text{cosec}A=1$, $\text{cosec}^2A-\cot^2A=1$, $\sec^2A-\tan^2A=1$

First open both brackets:
$(\sin A+\text{cosec}A)^2=\sin^2A+2+\text{cosec}^2A$
$(\cos A+\sec A)^2=\cos^2A+2+\sec^2A$

Now arrange the terms in pairs:
$(\sin^2A+\cos^2A)+4+(\text{cosec}^2A-\cot^2A)+(\sec^2A-\tan^2A)$

Each pair gives 1: $1+4+1+1=7$. The answer is **7**.

Short Trick Put $A=45^\circ$:
$(\frac{1}{\sqrt{2}}+\sqrt{2})^2\times2-2=\frac{9}{2}\times2-2=7$.

02 ANSWER (a) 5

SSC Phase-XIV (Graduation) 17 Sep 2026, Shift-I

Identity $\tan\theta\cdot\cot\theta=1$, $\sec^2\theta-\tan^2\theta=1$, $\text{cosec}^2\theta-\cot^2\theta=1$

Opening the first two squares:
$\sin^2\theta+\cos^2\theta+4+\text{cosec}^2\theta+\sec^2\theta=5+\text{cosec}^2\theta+\sec^2\theta$

The third square, the one being subtracted:
$\tan^2\theta + 2 + \cot^2\theta$

Now subtract:
$5 + (\text{cosec}^2\theta - \cot^2\theta) + (\sec^2\theta - \tan^2\theta) - 2 = 5 + 1 + 1 - 2 = 5.$
So the value is **5**.

Short Trick Put $\theta = 45°$: $\frac{9}{2} + \frac{9}{2} - (1+1)^2 = 9 - 4 = 5.$

03 ANSWER (a) $\frac{\sqrt{34}}{5}$

SSC Phase-XIV (Graduation) 17 Sep 2026, Shift-I

Identity $(\sin\theta + \cos\theta)^2 + (\sin\theta - \cos\theta)^2 = 2$

Given $\sin\theta - \cos\theta = \frac{4}{5}$, so
$(\sin\theta + \cos\theta)^2 = 2 - \left(\frac{4}{5}\right)^2 = 2 - \frac{16}{25} = \frac{34}{25}$

Take the positive root: $\sin\theta + \cos\theta = \frac{\sqrt{34}}{5}$, that is $\frac{\sqrt{34}}{5}$.

Examiner's Trap If you write $1 - \frac{16}{25} = \frac{9}{25}$, you will get a wrong option. The sum of the two squares is 2, not 1.

04 ANSWER (a) $\frac{7}{12}$

SSC Phase-XIV (Graduation) 17 Sep 2026, Shift-I

Identity $a^2 - b^2 = (a+b)(a-b)$ and $\sec^2\theta - \tan^2\theta = 1$

$\sec^4\theta - \tan^4\theta = (\sec^2\theta + \tan^2\theta)(\sec^2\theta - \tan^2\theta)$

The second bracket is 1, so it $= \frac{7}{12} \times 1 = \frac{7}{12}$.
The answer is $\frac{7}{12}$.

Note The data in this question is slightly off, because $\sec^2\theta \geq 1$, so $\sec^2\theta + \tan^2\theta$ can never be $\frac{7}{12}$. Still, the identity directly gives $\frac{7}{12}$, and that is what was accepted in the exam.

05 ANSWER (c) ±3

SSC Phase-XIV (Graduation) 19 Sep 2026, Shift-I

Rule: Sum of Squares
$(a\sin\theta + b\cos\theta)^2 + (b\sin\theta - a\cos\theta)^2 = a^2 + b^2$

Let $x = 5\sin\theta - 3\cos\theta$. By the rule,
$5^2 + x^2 = 3^2 + 5^2 = 34$

$x^2 = 34 - 25 = 9 \Rightarrow x = \pm 3$. So option ±3 is correct.

Short Trick As soon as you add the two squares, the cross-term $30\sin\theta\cos\theta$ cancels. That is why this rule works every time. Learn it by heart.

06 ANSWER (d) 3

SSC Phase-XIV (Graduation) 19 Sep 2026, Shift-I

Complementary Angles If $A + B = 90°$, then $\cos B = \sin A$, $\sec A = \text{cosec}\, B$, $\cot B = \tan A$

$\cos 72° = \sin 18°$ and $\sin 72° = \cos 18°$. So the first and third terms together give $\sin^2 18° + \cos^2 18° = 1$

From $\sin 29° = \cos 61°$, $\sec 61°\sin 29° = 1$. In the same way, from $\cos 29° = \sin 61°$, $\text{csc}\, 61°\cos 29° = 1$.
Numerator $= 1 + 1 + 1 = 3$

In the denominator put $\cot 42° = \tan 48°$, so
$\sec^2 48° - \tan^2 48° = 1$.
Value $= \frac{3}{1} =$ **3**.

07 ANSWER (c) $\cos\theta$

SSC Phase-XIV (Graduation) 19 Sep 2026, Shift-I

Identity $(\text{csc}\,\theta + \cot\theta)(\text{csc}\,\theta - \cot\theta) = 1$

Since $p = \text{csc}\,\theta + \cot\theta$, directly $\text{csc}\,\theta - \cot\theta = \frac{1}{p}$

Now divide the numerator and denominator by p:
$\frac{p^2 - 1}{p^2 + 1} = \frac{p - \frac{1}{p}}{p + \frac{1}{p}} = \frac{(\text{csc}\,\theta + \cot\theta) - (\text{csc}\,\theta - \cot\theta)}{(\text{csc}\,\theta + \cot\theta) + (\text{csc}\,\theta - \cot\theta)} = \frac{2\cot\theta}{2\,\text{csc}\,\theta}$

$= \frac{\cos\theta}{\sin\theta} \times \sin\theta = \cos\theta.$
So the answer is $\cos\theta$.

Short Trick Put $\theta = 90°$: $p = 1 + 0 = 1$, expression $= 0$. Now only $\cos 90°$ and $\cot 90°$ give 0. To decide, take $\theta = 60°$: $p = \sqrt{3}$, expression $= \frac{2}{4} = \frac{1}{2} = \cos 60°$.

08 ANSWER (c) 13

SSC Phase-XIV (Graduation) 19 Sep 2026, Shift-I

Identity $\sin^6\theta + \cos^6\theta = 1 - 3\sin^2\theta\cos^2\theta$

To make the work easy, let $t = 2\sin\theta\cos\theta$. Then
$(\sin\theta - \cos\theta)^2 = 1 - t$, $(\sin\theta + \cos\theta)^2 = 1 + t$ and
$\sin^6\theta + \cos^6\theta = 1 - \frac{3t^2}{4}$

Expression
$= 3(1-t)^2 + 6(1+t) + 4 - 3t^2 = 3 - 6t + 3t^2 + 6 + 6t + 4 - 3t^2$

All the t terms cancel, leaving $3 + 6 + 4 = 13$. The answer is **13**.

Short Trick Just put $\theta = 0°$: $3(1) + 6(1) + 4(1) = 13$. A ten-second job.

09 **ANSWER (a)** 300°

SSC Phase-XIV (Graduation) 21 Sep 2026, Shift-I

Rule: Radian to Degree π radians $= 180^\circ$

Simply put 180° in place of π:
$\frac{5\pi}{3} = \frac{5\times 180^\circ}{3} = 5\times 60^\circ = 300^\circ$.
That is 300°.

10 **ANSWER (d)** $\sqrt{2}+1$

SSC Phase-XIV (Graduation) 22 Sep 2026, Shift-I

Identity $(\text{cosec}\theta - \cot\theta)(\text{cosec}\theta + \cot\theta) = 1$

So $\text{cosec}\theta + \cot\theta$ is just the reciprocal of the given value: $\frac{1}{\sqrt{2}-1}$

Rationalise it: $\frac{1}{\sqrt{2}-1}\times\frac{\sqrt{2}+1}{\sqrt{2}+1} = \frac{\sqrt{2}+1}{2-1} = \sqrt{2}+1$.
The correct option is $\sqrt{2}+1$.

11 **ANSWER (c)** $\frac{\sqrt{41}}{5}$

SSC Phase-XIV (Graduation) 22 Sep 2026, Shift-I

Identity $(\sin\theta+\cos\theta)^2 + (\sin\theta-\cos\theta)^2 = 2$

$(\sin\theta+\cos\theta)^2 = 2 - \frac{9}{25} = \frac{41}{25}$, and taking the positive value, $\sin\theta+\cos\theta = \frac{\sqrt{41}}{5}$.
The answer is $\frac{\sqrt{41}}{5}$.

12 **ANSWER (d)** 5

SSC Phase-XIV (Graduation) 22 Sep 2026, Shift-I

Formula: sin(A+B) $\sin A\cos B + \cos A\sin B = \sin(A+B)$

Spot the bracket. It is $\sin(21^\circ + 69^\circ) = \sin 90^\circ = 1$. So the first part $= 2$

$\sin 36^\circ = \cos 54^\circ$, so $3\sec 54^\circ \sin 36^\circ = 3$. Numerator $= 2 + 3 = 5$

In the denominator put $\tan 75^\circ = \cot 15^\circ$, so $\text{cosec}^2 15^\circ - \cot^2 15^\circ = 1$.
Value $= \frac{5}{1} = 5$, that is **5**.

13 **ANSWER (d)** $\frac{1-\sin\theta}{\cos\theta}$

SSC Phase-XIV (Graduation) 22 Sep 2026, Shift-I

Identity $\sec^2\theta - \tan^2\theta = 1$, which means $(\sec\theta-\tan\theta)(\sec\theta+\tan\theta) = 1$

Note that the trick lies in the 1 of the denominator.

Replace it with $\sec^2\theta - \tan^2\theta$:
$\tan\theta + \sec\theta - (\sec\theta - \tan\theta)(\sec\theta+\tan\theta)$
$= (\sec\theta+\tan\theta)(1 - \sec\theta + \tan\theta)$

The numerator $\tan\theta - \sec\theta + 1$ is exactly this factor, so it cancels. What remains is $\frac{1}{\sec\theta+\tan\theta} = \sec\theta - \tan\theta$
$\sec\theta - \tan\theta = \frac{1}{\cos\theta} - \frac{\sin\theta}{\cos\theta} = \frac{1-\sin\theta}{\cos\theta}$.
That makes option $\frac{1-\sin\theta}{\cos\theta}$ correct.

Short Trick Check by putting $\theta = 30^\circ$. Expression $\approx \frac{0.577 - 1.155 + 1}{0.577 + 1.155 - 1} = \frac{0.422}{0.732} \approx 0.577$, and option (D) $= \frac{1-0.5}{0.866} \approx 0.577$. The two match.

14 **ANSWER (a)** $-\frac{13\pi}{6}$

SSC Phase-XIV (Graduation) 23 Sep 2026, Shift-I

Rule: Degree to Radian $1^\circ = \frac{\pi}{180}$ radian

$-390\times\frac{\pi}{180} = -\frac{390\pi}{180}$, and cancelling by 30 gives $-\frac{13\pi}{6}$.
The answer is $-\frac{13\pi}{6}$.

15 **ANSWER (a)** 4

SSC Phase-XIV (Graduation) 24 Sep 2026, Shift-I

Method: Squaring Put $\sin^2\theta = 1 - \cos^2\theta$ and bring everything in terms of $\cos^2\theta$

Given $\sin\theta(1+\sin^2\theta) = \cos^2\theta$. Let $c = \cos^2\theta$, then $1 + \sin^2\theta = 2 - c$ and $\sin\theta(2-c) = c$

Square both sides to remove $\sin\theta$: $(1-c)(2-c)^2 = c^2$
$(1-c)(4-4c+c^2) = 4 - 8c + 5c^2 - c^3$

$4 - 8c + 5c^2 - c^3 = c^2 \Rightarrow c^3 - 4c^2 + 8c = 4$

Put c back: $\cos^6\theta - 4\cos^4\theta + 8\cos^2\theta = 4$.
So the value is **4**.

16 **ANSWER (a)** 2

SSC Phase-XIV (Graduation) 24 Sep 2026, Shift-I

Identity $\tan A + \cot A = \frac{1}{\sin A\cos A}$

Square $\sin A + \cos A = \sqrt{2}$:
$1 + 2\sin A\cos A = 2 \Rightarrow \sin A\cos A = \frac{1}{2}$

$\tan A + \cot A = \frac{\sin^2 A + \cos^2 A}{\sin A\cos A} = \frac{1}{1/2} = 2$.
That is **2**.

Short Trick $\sin A + \cos A = \sqrt{2}$ holds only at $A = 45^\circ$.
Then $\tan 45^\circ + \cot 45^\circ = 1 + 1 = 2$.

17 **ANSWER (d) 3**

SSC Phase-XIV (Graduation) 24 Sep 2026, Shift-I

Complementary Angles $42^\circ + 48^\circ = 90^\circ$, so $\sec 48^\circ = \text{cosec}\,42^\circ$ and $\text{cosec}\,48^\circ = \sec 42^\circ$

Now $\sin 42^\circ \cdot \text{cosec}\,42^\circ = 1$ and $\cos 42^\circ \cdot \sec 42^\circ = 1$

$\tan 52^\circ = \cot 38^\circ$, so $\tan 38^\circ \tan 52^\circ = 1$. Numerator $= 3$

In the denominator, putting $\tan 59^\circ = \cot 31^\circ$ gives $\text{cosec}^2 31^\circ - \cot^2 31^\circ = 1$.

Value $= 3$, so the correct option is **3**.

18 **ANSWER (c) 2**

SSC Phase-XIV (Graduation) 24 Sep 2026, Shift-I

Formula: Sum/Diff of Cubes $a^3 \pm b^3 = (a \pm b)(a^2 \mp ab + b^2)$

Factorise and cancel with the denominator. First term $= \cos^2\theta - \sin\theta\cos\theta + \sin^2\theta = 1 - \sin\theta\cos\theta$

Second term $= \cos^2\theta + \sin\theta\cos\theta + \sin^2\theta = 1 + \sin\theta\cos\theta$

On adding, $\sin\theta\cos\theta$ cancels:
$1 - \sin\theta\cos\theta + 1 + \sin\theta\cos\theta = 2$. The answer is **2**.

Short Trick Put $\theta = 0^\circ$: $\frac{1}{1} + \frac{1}{1} = 2$.

19 **ANSWER (c) 3**

SSC Phase-XIV (12th) 16 Sep 2026, Shift-II

Complementary Angles $\sec(90^\circ - \theta) = \text{cosec}\,\theta$, $\text{cosec}(90^\circ - \theta) = \sec\theta$

$\sec 72^\circ = \text{cosec}\,18^\circ$, so $\sin 18^\circ \sec 72^\circ = 1$

In the same way, $\csc 72^\circ = \sec 18^\circ$ gives $\cos 18^\circ \csc 72^\circ = 1$. And $\tan 35^\circ \cot 35^\circ = 1$ anyway.

Total $= 1 + 1 + 1 =$ **3**.

20 **ANSWER (a) 0**

SSC Phase-XIV (12th) 16 Sep 2026, Shift-II

Identity $(\sin\theta + \cos\theta)^2 = 1 + 2\sin\theta\cos\theta$

Square both sides: $1 + 2\sin\theta\cos\theta = 1$, so $2\sin\theta\cos\theta = 0 \Rightarrow \sin\theta\cos\theta = 0$.
The answer is **0**.

Short Trick $\sin\theta + \cos\theta = 1$ only at $\theta = 0^\circ$ or 90°, and at both the product is 0.

21 **ANSWER (b) 1**

SSC Phase-XIV (12th) 16 Sep 2026, Shift-II

Concept: Reciprocal $\cot A = \frac{1}{\tan A}$

Let $t = \tan A$. Given $t + t^2 = 1$, that is $1 - t = t^2$

$\cot^2 A - \cot A = \frac{1}{t^2} - \frac{1}{t} = \frac{1-t}{t^2} = \frac{t^2}{t^2} = 1$.
So the value is **1**.

Short Trick Divide the given equation directly by $\tan^2 A$: $\cot A + 1 = \cot^2 A$, that is $\cot^2 A - \cot A = 1$.

22 **ANSWER (b) (-7)**

SSC Phase-XIV (12th) 17 Sep 2026, Shift-II

Method: Divide by cos $\frac{\sin\theta + \cos\theta}{\sin\theta - \cos\theta} = \frac{\tan\theta + 1}{\tan\theta - 1}$

When $\tan\theta$ is given, divide both numerator and denominator by $\cos\theta$. The expression becomes $\frac{\tan\theta + 1}{\tan\theta - 1}$.

$= \frac{\frac{3}{4} + 1}{\frac{3}{4} - 1} = \frac{7/4}{-1/4} = -7$, that is **(-7)**.

Short Trick Take $\sin\theta$ and $\cos\theta$ in the ratio 3 : 4: $\frac{3+4}{3-4} = -7$.

23 **ANSWER (a) 7/9**

SSC Phase-XIV (12th) 18 Sep 2026, Shift-II

Identity $\sin^4\theta + \cos^4\theta = 1 - 2\sin^2\theta\cos^2\theta$

$\sin^4\theta + \cos^4\theta = (\sin^2\theta + \cos^2\theta)^2 - 2\sin^2\theta\cos^2\theta = 1 - 2\left(\frac{1}{3}\right)^2 = 1 - \frac{2}{9} = \frac{7}{9}$.
The answer is **7/9**.

Examiner's Trap If you subtract $2 \times \frac{1}{3} = \frac{2}{3}$ and write $\frac{1}{3}$, that is wrong. You must square $\sin\theta\cos\theta$. This is exactly where students slip.

24 **ANSWER (b) $\frac{2\sqrt{3}}{3}$**

SSC Phase-XIV (12th) 18 Sep 2026, Shift-II

Formula: tan(A+B) $\tan(\alpha + \beta) = \frac{\tan\alpha + \tan\beta}{1 - \tan\alpha\tan\beta}$

Since $\alpha + \beta = 60^\circ$, $\tan 60^\circ = \sqrt{3} = \frac{\tan\alpha + \tan\beta}{1 - \frac{1}{3}}$

$\tan\alpha + \tan\beta = \sqrt{3} \times \frac{2}{3} = \frac{2\sqrt{3}}{3}$.
The correct option is $\frac{2\sqrt{3}}{3}$.

Short Trick Check it: at $\alpha = \beta = 30^\circ$, $\tan\alpha\tan\beta = \frac{1}{3}$ fits, and the sum $= \frac{2}{\sqrt{3}} = \frac{2\sqrt{3}}{3}$.

25 **ANSWER (c)** 9°

SSC Phase-XIV (12th) 19 Sep 2026, Shift-II

Rule: Complementary Angles If $\sec A = \csc B$ and both angles are acute, then $A + B = 90^\circ$.

Here $A = 7\theta - 11^\circ$ and $B = 4\theta + 2^\circ$. Add the two and put the sum equal to 90: $(7\theta - 11) + (4\theta + 2) = 90$

$11\theta - 9 = 90 \Rightarrow 11\theta = 99 \Rightarrow \theta = 9^\circ$

Check it once: $52^\circ + 38^\circ = 90^\circ$ ✓ So $\theta = 9^\circ$.

26 **ANSWER (c)** 1

SSC Phase-XIV (12th) 19 Sep 2026, Shift-II

Identity $\sin^2\theta + \cos^2\theta = 1$, whatever the angle.

This identity holds for every θ. So the given value of $\sin^2\theta$ or the sign of $\cos\theta$ makes no difference. The answer will always be **1**.

Examiner's Trap Seeing $\sin^2\theta = \frac{9}{25}$, students quickly find $\cos^2\theta = \frac{16}{25}$ and mark option (B). Read carefully. The question asks for the sum of both, not just $\cos^2\theta$.

27 **ANSWER (c)** 2

SSC Phase-XIV (12th) 19 Sep 2026, Shift-II

Formula $(a-b)^2 + (a+b)^2 = 2(a^2 + b^2)$ and $\csc^2 A = 1 + \cot^2 A$

First open both brackets together:
$2(\csc^2 A + \cot^2 A) = 2(1 + \cot^2 A + \cot^2 A) = 2 + 4\cot^2 A$

Now subtract $4\cot^2 A$ from this. Only **2** is left.

Short Trick Put $A = 45^\circ$. Then $\csc A = \sqrt{2}$, $\cot A = 1$, so $(\sqrt{2} - 1)^2 + (\sqrt{2} + 1)^2 - 4 = 6 - 4 = 2$

28 **ANSWER (a)** $\sqrt{3}$

SSC Phase-XIV (12th) 21 Sep 2026, Shift-II

Standard Values $\sin 30^\circ = \frac{1}{2}$, $\cot 30^\circ = \sqrt{3}$

$\sin A = \frac{1}{2}$ means $A = 30^\circ$ (taking it as acute).

$\cot 30^\circ = \frac{\cos 30^\circ}{\sin 30^\circ} = \frac{\sqrt{3}/2}{1/2} = \sqrt{3}$

That makes option (a) $\sqrt{3}$ correct.

29 **ANSWER (b)** 1

SSC Phase-XIV (12th) 21 Sep 2026, Shift-II

Rule: Complementary Angles If $p + q = 90^\circ$, then $\sec q = \csc p$, $\tan q = \cot p$ and $\sin q = \cos p$

By this rule, $\csc p - \sec q = 0$ and $\cot p - \tan q = 0$. So the first two terms become 0 straight away, whatever the power.

In the third term, $\sin^2 p + \sin^2 q = \sin^2 p + \cos^2 p = 1$ and $\cos^2 p + \cos^2 q = \cos^2 p + \sin^2 p = 1$

Total $= 0 + 0 + 1 \times 1 =$ **1**

30 **ANSWER (a)** 2/3

SSC Phase-XIV (12th) 22 Sep 2026, Shift-II

Rule: Maximum Value The maximum value of $a\sin\theta + b\cos\theta$ is $\sqrt{a^2 + b^2}$, and it occurs when $\tan\theta = \frac{a}{b}$

Here $a = 2$, $b = 3$, so $\sqrt{4 + 9} = \sqrt{13}$. This means the value given in the question is the maximum value itself.

So directly $\tan\theta = \frac{a}{b} = \frac{2}{3}$

Check: putting $\sin\theta = \frac{2}{\sqrt{13}}$, $\cos\theta = \frac{3}{\sqrt{13}}$ gives $\frac{4+9}{\sqrt{13}} = \sqrt{13}$ ✓

The answer is **2/3**.

Short Trick You can also do it from the options. Take $\tan\theta = \frac{2}{3}$. Then $\sin\theta = \frac{2}{\sqrt{13}}$, $\cos\theta = \frac{3}{\sqrt{13}}$, and the equation fits at once.

31 **ANSWER (c)** 19°

SSC Phase-XIV (12th) 23 Sep 2026, Shift-II

Rule: Complementary Angles If $\sin A = \cos B$ (acute angles), then $A + B = 90^\circ$

$(\theta + 22) + (3\theta - 8) = 90 \Rightarrow 4\theta + 14 = 90$

$4\theta = 76 \Rightarrow \theta =$ **19°**

32 **ANSWER (c)** 1

SSC Phase-XIV (12th) 23 Sep 2026, Shift-II

Identity $1 - \sin^2\theta = \cos^2\theta$

Write the numerator as $\cos^2\theta$. Then $\frac{\cos^2\theta}{\cos^2\theta} = 1$. The correct option is **1**.

33 **ANSWER (a)** $2\sec^2 A$

SSC Phase-XIV (12th) 23 Sep 2026, Shift-II

Identity $\csc^2 A - 1 = \cot^2 A$

First take the LCM: $\frac{\csc A(\csc A+1)+\csc A(\csc A-1)}{\csc^2 A-1} = \frac{2\csc^2 A}{\cot^2 A}$

Now change it into sin and cos:

$\frac{\csc^2 A}{\cot^2 A} = \frac{1/\sin^2 A}{\cos^2 A/\sin^2 A} = \frac{1}{\cos^2 A} = \sec^2 A$

So the whole expression $= 2\sec^2 A$, that is $2\sec^2 A$.

Examiner's Trap Stopping at $\frac{2\csc^2 A}{\cot^2 A}$ and marking option (B), $2\csc^2 A$. Do not forget the $\cot^2 A$ sitting in the denominator.

34 ANSWER (c) 3

SSC Phase-XIV (12th) 24 Sep 2026, Shift-II

Rule: Complementary Angles $\sin(90^\circ - x) = \cos x$ and $\tan(90^\circ - x) = \cot x$

Make pairs. $\sin^2 72^\circ = \cos^2 18^\circ$, so $\sin^2 18^\circ + \cos^2 18^\circ = 1$

$\cos^2 54^\circ = \sin^2 36^\circ$, so $\cos^2 36^\circ + \sin^2 36^\circ = 1$

$\tan 75^\circ = \cot 15^\circ$, so $\tan 15^\circ \cot 15^\circ = 1$

Total $= 1 + 1 + 1 =$ **3**

35 ANSWER (d) 2

SSC Phase-XIV (12th) 24 Sep 2026, Shift-II

Formula $\tan\theta + \cot\theta = \frac{1}{\sin\theta\cos\theta}$

Square both sides: $1 + 2\sin\theta\cos\theta = 2 \Rightarrow \sin\theta\cos\theta = \frac{1}{2}$

Now put it in the formula:

$\tan\theta + \cot\theta = \frac{\sin^2\theta+\cos^2\theta}{\sin\theta\cos\theta} = \frac{1}{1/2} = 2$

So the answer is **2**.

Short Trick $\sin\theta + \cos\theta = \sqrt{2}$ is possible only at $\theta = 45^\circ$. Then $\tan 45^\circ + \cot 45^\circ = 1 + 1 = 2$. Done.

36 ANSWER (b) 143

SSC Phase-XIV (12th) 25 Sep 2026, Shift-II

Formula: Radian to Degree Degrees = radians $\times \frac{180}{\pi}$ and $60' = 1^\circ$

First convert to degrees: $\frac{719\pi}{900} \times \frac{180}{\pi} = \frac{719}{5} = 143.8^\circ$

Now change the decimal part into minutes:

$0.8^\circ = 0.8 \times 60' = 48'$

So $143.8^\circ = 143^\circ 48'$, which gives $X =$ **143**

37 ANSWER (b) 15/17

SSC Phase-XIV (12th) 25 Sep 2026, Shift-II

Identity $(\csc\theta + \cot\theta)(\csc\theta - \cot\theta) = 1$

The sum is 4, so the difference is its reciprocal:

$\csc\theta - \cot\theta = \frac{1}{4}$

Adding the two, $2\csc\theta = 4 + \frac{1}{4} = \frac{17}{4} \Rightarrow \csc\theta = \frac{17}{8}$

Subtracting, $2\cot\theta = \frac{15}{4} \Rightarrow \cot\theta = \frac{15}{8}$

$\cos\theta = \frac{\cot\theta}{\csc\theta} = \frac{15/8}{17/8} = \frac{15}{17}$

So option (b) **15/17** is correct.

Short Trick Remember, if $\csc\theta + \cot\theta = k$, then directly $\cos\theta = \frac{k^2-1}{k^2+1}$. Here $\frac{16-1}{16+1} = \frac{15}{17}$

38 ANSWER (d) 62°

SSC Phase-XIV (12th) 26 Sep 2026, Shift-I

Concept: Complementary Angle If two angles are complementary, their sum is 90°.

Complement of $28^\circ = 90^\circ - 28^\circ = 62^\circ$. This is also the angle between the ladder and the wall. Answer: **62°**.

Examiner's Trap Confusing complementary (sum 90°) with supplementary (sum 180°). Taking the supplement gives 152°, which is not even in the options.

39 ANSWER (c) 6049/256

SSC Phase-XIV (12th) 26 Sep 2026, Shift-I

Formula $\tan\theta + \cot\theta = \frac{1}{\sin\theta\cos\theta}$

$a^2 + b^2 = (a+b)^2 - 2ab$

Squaring:

$1 + 2\sin\theta\cos\theta = \frac{49}{81} \Rightarrow 2\sin\theta\cos\theta = -\frac{32}{81} \Rightarrow \sin\theta\cos\theta = -\frac{16}{81}$

So $\tan\theta + \cot\theta = \frac{1}{\sin\theta\cos\theta} = -\frac{81}{16}$

Now apply the square formula:

$\tan^2\theta + \cot^2\theta = (\tan\theta + \cot\theta)^2 - 2\tan\theta\cot\theta = \frac{6561}{256} - 2 = \frac{6049}{256}$

The correct option is **6049/256**.

Examiner's Trap If $\sin\theta\cos\theta$ comes out negative, don't panic and stop. It gets squared later, and the sign goes away on its own.

24

CHAPTER

Height & Distance

Questions *10 questions · 7 shifts*

Height & Distance

Directions (Q. 01–10): *Choose the correct answer from the four given options.*

01 A man standing on the deck of a ship (25 m above water level) observes the angle of elevation of the top of a cliff as 60° and the angle of depression of its base as 30°. Find the height of the cliff.

SSC Phase-XIV (Graduation) 18 Sep 2026, Shift-I

(a) 90 m (b) 100 m
(c) 103.92 m (d) 152 m

02 A balloon is observed from two points A and B on the ground, which are 1200 m apart. The angles of elevation of the balloon from these points are 60° and 30° respectively. If the balloon is between A and B, find its height.

SSC Phase-XIV (Graduation) 21 Sep 2026, Shift-I

(a) $300\sqrt{3}$ m (b) $200\sqrt{3}$ m
(c) 500 m (d) 600 m

03 Two towers of heights h_1 and h_2 subtend angles of 30° and 60° respectively at a point on the line joining their feet. If the distance between the towers is d, what will be the ratio of their heights $h_1 : h_2$ if the point lies at the midpoint?

SSC Phase-XIV (Graduation) 23 Sep 2026, Shift-I

(a) 1:3 (b) 3:1 (c) 4:5 (d) 5:4

04 From a point h m above a lake, the angle of elevation of a cloud is α and the angle of depression of its reflection in the lake is β. Find the height of the cloud above the lake.

SSC Phase-XIV (Graduation) 25 Sep 2026, Shift-I

(a) $H = h\frac{(\tan\alpha+\tan\beta)}{(\tan\beta-\tan\alpha)}$ (b) $H = h\frac{(\tan\alpha-\tan\beta)}{(\tan\beta+\tan\alpha)}$
(c) $H = h\frac{(\tan\alpha\tan\beta)}{(\tan\beta-\tan\alpha)}$ (d) $H = h\frac{(\tan\alpha)}{(\tan\beta-\tan\alpha)}$

05 A wooden stick rests against a wall and makes an angle of 30° with the ground. If the stick is 15 m long, the vertical distance between the point where it touches the wall and the ground is:

SSC Phase-XIV (12th) 21 Sep 2026, Shift-II

(a) 7 m (b) 7.25 m (c) 7.5 m (d) 7.75 m

06 A mirror is placed on the ground facing the ceiling. A girl sees the top of a tower in the mirror, and the tower is at a distance of 210 m from the mirror. The girl is 1 m away from the mirror and her height is 1 m. Find the height of the tower in metres.

SSC Phase-XIV (12th) 21 Sep 2026, Shift-II

(a) 105 m (b) 150 m (c) 200 m (d) 210 m

07 The angle of elevation of the top of a building from a point at a distance of 24 m is 60°. What is the height of the building?

SSC Phase-XIV (12th) 24 Sep 2026, Shift-II

(a) $8\sqrt{3}$ m (b) $12\sqrt{3}$ m
(c) $24\sqrt{3}$ m (d) $48\sqrt{3}$ m

08 The angle of elevation of the top of a vertical cliff from a point is 30°. After walking 60 m towards the cliff, the angle becomes 60°. Find the height of the cliff.

SSC Phase-XIV (12th) 24 Sep 2026, Shift-II

(a) $20\sqrt{3}$ m (b) $30\sqrt{3}$ m

(c) $40\sqrt{3}$ m (d) $60\sqrt{3}$ m

09 A tree 12 m high casts a shadow $12\sqrt{3}$ m long. Find the angle of elevation of the sun.

SSC Phase-XIV (12th) 26 Sep 2026, Shift-I

(a) 30° (b) 45° (c) 60° (d) 90°

10 From the roof of a building 20 m high, the angle of elevation of the top of a tower is 45° and the angle of depression of its foot is 30°. Find the height of the tower.

SSC Phase-XIV (12th) 26 Sep 2026, Shift-I

(a) $20\sqrt{3}$ m (b) $20(\sqrt{3}+1)$ m
(c) $40\sqrt{3}$ m (d) $20(2\sqrt{3}+1)$ m

Answer Key *SSC official key*

Height & Distance (Q. 01–10)

01	(b)	**02**	(a)	**03**	(a)	**04**	(a)	**05**	(c)	**06**	(d)	**07**	(c)	**08**	(b)	**09**	(a)	**10**	(b)

Detailed Explanations रटना बंद, समझना शुरू

Height & Distance

01 **ANSWER (b)** 100 m

SSC Phase-XIV (Graduation) 18 Sep 2026, Shift-I

Formula $\tan\theta = \frac{h}{d}$

First the lower triangle. From the angle of depression 30°, the horizontal distance
$d = \frac{25}{\tan 30^\circ} = 25\sqrt{3}$ m

Now the upper triangle. Part of the cliff above the deck $= d\tan 60^\circ = 25\sqrt{3} \times \sqrt{3} = 75$ m

Total height $= 25 + 75 =$ **100 m**

Short Trick $\frac{\tan 60^\circ}{\tan 30^\circ} = 3$, so the upper part is 3 times the lower part, that is $3 \times 25 = 75$. Total $= 4 \times 25 = 100$ m

02 **ANSWER (a)** $300\sqrt{3}$ m

SSC Phase-XIV (Graduation) 21 Sep 2026, Shift-I

Formula Base $= \frac{h}{\tan\theta}$

Let the height be h. Distance from A $= \frac{h}{\tan 60^\circ} = \frac{h}{\sqrt{3}}$
and distance from B $= \frac{h}{\tan 30^\circ} = h\sqrt{3}$

The balloon is between the two points, so the two distances add up to 1200:
$\frac{h}{\sqrt{3}} + h\sqrt{3} = 1200 \Rightarrow \frac{4h}{\sqrt{3}} = 1200$

This gives $h = 300\sqrt{3}$ m, so the answer is $300\sqrt{3}$ **m**.

Short Trick In a 30° and 60° case, the distances split in the ratio 1 : 3, that is 300 and 900. Then $h = 300\tan 60^\circ = 300\sqrt{3}$

03 **ANSWER (a)** 1:3

SSC Phase-XIV (Graduation) 23 Sep 2026, Shift-I

Concept For equal bases, height $\propto \tan\theta$

The point is in the middle, so both towers are $\frac{d}{2}$ away. $h_1 = \frac{d}{2}\tan 30^\circ$ and $h_2 = \frac{d}{2}\tan 60^\circ$
$h_1 : h_2 = \frac{1}{\sqrt{3}} : \sqrt{3} =$ **1:3**

04 **ANSWER (a)** $H = h\frac{(\tan\alpha + \tan\beta)}{(\tan\beta - \tan\alpha)}$

SSC Phase-XIV (Graduation) 25 Sep 2026, Shift-I

Concept: Reflection The image of the cloud in the lake appears at a depth H below the water, the same as the height of the cloud above it.

Let the height of the cloud be H and the horizontal distance be d. From the observer to the cloud:
$\tan\alpha = \frac{H-h}{d}$

From the observer to the image (depth H):
$\tan\beta = \frac{H+h}{d}$

d is the same in both, so equate them:
$\frac{H-h}{\tan\alpha} = \frac{H+h}{\tan\beta} \Rightarrow H(\tan\beta - \tan\alpha) = h(\tan\alpha + \tan\beta)$

$H = h\frac{\tan\alpha + \tan\beta}{\tan\beta - \tan\alpha}$
This matches **option (A)**.

Short Trick H will always be greater than h, and $\beta > a$. Only in option (A) is the numerator larger than the denominator and positive.

---

05 **ANSWER (c)** 7.5 m

SSC Phase-XIV (12th) 21 Sep 2026, Shift-II

Formula $\sin\theta = \frac{P}{H}$

The stick itself is the hypotenuse, 15 m, and its angle with the ground is 30°. So the vertical height $= 15\sin 30^\circ = 15 \times \frac{1}{2} = 7.5$ m

The correct answer is **7.5 m**.

---

06 **ANSWER (d)** 210 m

SSC Phase-XIV (12th) 21 Sep 2026, Shift-II

Concept: Reflection Angle of incidence = angle of reflection, so the two triangles are similar.

By similarity, height of tower / its distance = height of girl / her distance: $\frac{h}{210} = \frac{1}{1}$

So $h = 210$ m. Answer: **210 m**.

---

07 **ANSWER (c)** $24\sqrt{3}$ m

SSC Phase-XIV (12th) 24 Sep 2026, Shift-II

Formula Height = base $\times \tan\theta$

Direct method: height $= 24 \times \tan 60^\circ = 24\sqrt{3}$ m, so the answer is $24\sqrt{3}$ **m**.

Examiner's Trap If you take $\tan 30^\circ$ by mistake instead of $\tan 60^\circ$, you get $8\sqrt{3}$, and that is sitting right there in option (A).

---

08 **ANSWER (b)** $30\sqrt{3}$ m

SSC Phase-XIV (12th) 24 Sep 2026, Shift-II

Formula Height = base $\times \tan\theta$

Let the distance of the cliff from the new point be d. Then $h = d\tan 60^\circ = d\sqrt{3}$

From the first point: $h = (d + 60)\tan 30^\circ = \frac{d+60}{\sqrt{3}}$

Equate the two: $3d = d + 60 \Rightarrow d = 30$. So $h = 30\sqrt{3}$ m, that is $30\sqrt{3}$ **m**.

Short Trick When the angle changes from 30° to 60°, the distance walked is itself the hypotenuse.

Then $h = \frac{\sqrt{3}}{2} \times 60 = 30\sqrt{3}$ m

---

09 **ANSWER (a)** 30°

SSC Phase-XIV (12th) 26 Sep 2026, Shift-I

Formula $\tan\theta = \frac{h}{d}$ (height/shadow)

$\tan\theta = \frac{12}{12\sqrt{3}} = \frac{1}{\sqrt{3}}$, so $\theta =$ **30°**

Short Trick If the shadow is $\sqrt{3}$ times the height, the angle is 30°. If the height is $\sqrt{3}$ times the shadow, it is 60°. This pattern comes again and again in the exam.

---

10 **ANSWER (b)** $20(\sqrt{3} + 1)$ m

SSC Phase-XIV (12th) 26 Sep 2026, Shift-I

Formula Base $= \frac{h}{\tan\theta}$

First find the horizontal distance. From the angle of depression 30°, $d = \frac{20}{\tan 30^\circ} = 20\sqrt{3}$ m

Part of the tower above roof level $= d\tan 45^\circ = 20\sqrt{3}$ m

Total height $= 20 + 20\sqrt{3} = 20(\sqrt{3} + 1)$ m

That makes option (b) $20(\sqrt{3} + 1)$ **m** correct.

Examiner's Trap Taking only the part above the roof, $20\sqrt{3}$ (option A), and stopping there. You must add the 20 m building below as well.

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25 CHAPTER Coordinate Geometry

Questions *4 questions · 4 shifts*

Coordinate Geometry

Directions (Q. 01–04): *Choose the correct answer from the four given options.*

01 Which of the following lines passes through the origin and makes an angle of 90° with the line whose angle of inclination is 30°?

SSC Phase-XIV (Graduation) 18 Sep 2026, Shift-I

(a) $y=\tan(30^\circ)\cdot x$ (b) $y=-\tan(30^\circ)\cdot x$
(c) $y=\tan(60^\circ)\cdot x$ (d) $y=-\tan(60^\circ)\cdot x$

02 Which of the following transformations maps the line $y=x$ onto another line perpendicular to it and passing through the origin?

SSC Phase-XIV (Graduation) 23 Sep 2026, Shift-I

(a) Rotation of 90° about the origin
(b) Reflection about the x-axis
(c) Translation by (1,1)
(d) Rotation of 45° about the origin

03 Find the distance between the points where the line $y=x+1$ intersects the x-axis and the y-axis.

SSC Phase-XIV (Graduation) 25 Sep 2026, Shift-I

(a) 0 (b) 1 (c) $\sqrt{5}$ (d) $\sqrt{2}$

04 Which of the following equations represents a horizontal line?

SSC Phase-XIV (12th) 17 Sep 2026, Shift-II

(a) $5x+3y=12$ (b) $4x+9y=13$
(c) $y=7/3$ (d) $x=12/7$

Answer Key *SSC official key*

Coordinate Geometry (Q. 01–04)							
01	(d)	02	(a)	03	(d)	04	(c)

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Coordinate Geometry

01 ANSWER (d) $y=-\tan(60^\circ)\cdot x$

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Rule: Perpendicular Lines $m_1\times m_2=-1$

Line through the origin: $y=mx$

Slope of the given line $m_1=\tan 30^\circ=\frac{1}{\sqrt{3}}$

Slope of the perpendicular line

$m_2=-\frac{1}{m_1}=-\sqrt{3}=-\tan 60^\circ$

It passes through the origin, so the line is

$y=-\tan(60^\circ)\cdot x$

Short Trick Rotate the 30° line by 90° and the new inclination becomes 120°. And $\tan 120^\circ=-\tan 60^\circ$

02 **ANSWER (a)** Rotation of 90° about the origin

SSC Phase-XIV (Graduation) 23 Sep 2026, Shift-I

Concept In a rotation of 90° about the origin, (x, y) changes to $(-y, x)$.

The slope of $y = x$ is 1, so its perpendicular line through the origin is $y = -x$.

Take the point (1, 1) on $y = x$. Rotating it by 90° gives $(-1, 1)$, which lies on $y = -x$. So a 90° rotation turns $y = x$ into $y = -x$.
The correct option is **Rotation of 90° about the origin**.

Short Trick Note that reflection about the x-axis, $(x, y) \to (x, -y)$, also turns $y = x$ into $y = -x$. The wording of the question is a little loose, but (A) was accepted in the exam, because a 90° rotation is the direct, standard way to get a perpendicular line.

03 **ANSWER (d)** $\sqrt{2}$

SSC Phase-XIV (Graduation) 25 Sep 2026, Shift-I

Formula: Distance $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

On the x-axis put $y = 0$, so $x = -1$, point $(-1, 0)$.
On the y-axis put $x = 0$, so $y = 1$, point $(0, 1)$.

Distance $= \sqrt{1^2 + 1^2} = \sqrt{2}$

Short Trick If the intercepts are a and b, the part between the axes is directly $\sqrt{a^2 + b^2}$.

04 **ANSWER (c)** $y = 7/3$

SSC Phase-XIV (12th) 17 Sep 2026, Shift-II

Concept Horizontal line: $y = c$ (parallel to the x-axis)
Vertical line: $x = c$

(A) and (B) contain both x and y. These are slanting lines.

$x = \frac{12}{7}$ is a standing (vertical) line, while $y = \frac{7}{3}$ is a lying (horizontal) line. So the answer is $y = 7/3$.

Examiner's Trap Taking $x = c$ as horizontal. Remember, $x = c$ is actually parallel to the y-axis, that is, a standing line.

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