# RRB ALP 2026 CBT-1

## Assistant Loco Pilot · CEN 01/2026 · CBT-1 · Mathematics · Question Paper

**English**

All 9 Shifts (Sets) · Mathematics Section · Official Answer Key

## About this Compilation

This booklet contains all **9 shift papers** of the **RRB ALP 2026 CBT-1** examination in **English** (**Mathematics** section only), with the correct option marked as per the official answer key.

✓ Correct option (highlighted green)

**Sections.** The RRB ALP 2026 CBT-1 paper is a single section in which Mathematics, Mental Ability and General Science questions are mixed. In this book the questions of every shift are grouped by subject (Mathematics, General Intelligence and Reasoning, General Science, General Awareness) from our topic tags. Answers are as per the official answer key.

### How to use

- Use the **Index** page to jump directly to any set (clickable).
- Questions appear section by section in the order of the paper, numbered 1 onward.
- Diagram and wide-table questions appear at full width at the end of their section.
- The correct answer is highlighted in green with a tick.

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## Mathematics

25 Questions • Answer Key

**Q1** Mathematics

A car's radiator should contain a solution of 83% antifreeze. A motorist has 13 litres of 33% antifreeze. How many litres (rounded off to 2 decimal places) of 95% antifreeze liquid should he add to his solution to produce a 83% antifreeze?

A. 49.14
B. 56.14
C. 50.39
D. 54.17 ✓

**Q2** Mathematics

The slant height of a right circular cone is 40 cm and its height is 32 cm. Find the area (in $cm^2$) of its curved surface. (Use π = 3.14)

A. 3014.4 ✓
B. 3024.4
C. 3034.4
D. 3044.4

**Q3** Mathematics

A polygon is a combination of a parallelogram and a trapezium. The parallelogram has a base of 16 cm and a height of 9 cm, while the trapezium has parallel sides measuring 8 cm and 12 cm with a height of 6 cm. What percentage of the total area of the polygon is occupied by the trapezium?

A. $29\frac{21}{51}\%$ ✓
B. $29\frac{23}{51}\%$
C. $28\frac{23}{51}\%$
D. $28\frac{21}{51}\%$

**Q4** Mathematics

M and N are going on a road trip from city A to city D, passing through cities B and C. The time taken to travel between the cities is as follows: it takes 5 hours to get from A to B, 7 hours from B to C, and 9 hours from C to D. Their average speed is 20 m/s, and the distance from C to D is 567 km. Additionally, they travel from A to B at a speed of 25 m/s. If the distance between B and C is denoted as 'L' meters, find $\sqrt{L - 5000}$.

A. 700 ✓
B. 500
C. 200
D. 600

**Q5** Mathematics

A tap fills a tank in 7 hours. Another tap empties the full tank in 56 hours. How long (in hours) will it take to fill half of the tank, if the tank is empty initially and both the taps are opened together?

A. 8
B. 9
C. 5
D. 4 ✓

**Q6** Mathematics

Two numbers are in the ratio of 3 : 4. If 10 is added to both the numbers, then the ratio between two numbers becomes 11 : 13. Find the greater number.

A. 12
B. 20
C. 8
D. 16 ✓

**Q7** Mathematics

A shopkeeper allows a trade discount of 20% on an article with marked price of ₹5000. He further offers an extra cash discount of 5% on the reduced price for cash payment. What is the final amount to be paid in cash?

A. ₹4200
B. ₹3500
C. ₹3800 ✓
D. ₹4000

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**Q8** Mathematics

After six weekly quizzes, a student's average score stood at 18 marks. What was the student's cumulative score across these quizzes?

A. 96
B. 114
C. 108 ✓
D. 112

**Q9** Mathematics

A bank offers a fixed deposit scheme with 12% compound interest per annum, compounded half-yearly. If ₹10,000 is invested for one year, what will be the maturity amount (in ₹)?

A. 11,200
B. 10,600
C. 11,236 ✓
D. 11,272

**Q10** Mathematics

Evaluate the following.

$2 + (\sin A + \operatorname{cosec} A)^2 + (\cos A + \sec A)^2$

A. $9 + \tan^2 A + \cot^2 A$ ✓
B. $7 + \tan^2 A + \cot^2 A$
C. $\tan^2 A + \cot^2 A$
D. $5 + \tan^2 A + \cot^2 A$

**Q11** Mathematics

An online learning platform reports that a large batch of students has a mean mathematics score of 68 and a median score of 72. Assuming the empirical relation is valid for this dataset, what is the most likely modal score?

A. 88
B. 84
C. 80 ✓
D. 76

**Q12** Mathematics

A person invested ₹56,500 at a rate of 8% per annum simple interest for 4 years. Find the amount (in ₹) that he will receive after 4 years.

A. 75,580
B. 73,580
C. 74,580 ✓
D. 72,580

**Q13** Mathematics

Simplify:
$(48 \div 6 + 10 - 9 \times 2) + (15 \times 5 - 6)$

A. 75
B. 25
C. -15
D. 69 ✓

**Q14** Mathematics

The sum of the present ages of Stan and Benedict is 74 years. Four years ago from now, Benedict's age was half of Stan's then age. How old (in years) is Stan at present?

A. 50
B. 48 ✓
C. 44
D. 42

**Q15** Mathematics

Vanraj is three times as old as his son, and his daughter is 3 years younger than the son. If the sum of the ages of these three people 3 years ago was 123 years, then Vanraj's present age (in years) is:

A. 78
B. 81 ✓
C. 41
D. 48

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**Q16** Mathematics

A sum is invested in two education savings schemes that both provide 10% compound interest per annum. Scheme A compounds annually, whereas Scheme B compounds half-yearly. After one year, the maturity amount under Scheme B exceeds that of Scheme A by ₹12.50. Find the principal amount (in ₹).

A. 10,000
B. 5,000 ✓
C. 12,500
D. 2,500

**Q17** Mathematics

In a circle of radius 17 cm, a chord is at a distance of 8 cm from its centre. What is the length (in cm) of the chord?

A. 35
B. 30 ✓
C. 40
D. 25

**Q18** Mathematics

AB is parallel to CD. A transversal PQ intersects AB and CD at E and F, respectively, and ∠PEB = 25°. G is a point between AB and CD such that ∠BEG = 43° and ∠GFE = 10°. What is the measure of ∠EGF?

A. 70°
B. 43°
C. 48°
D. 58° ✓

**Q19** Mathematics

The 7-digit number 33A292B is divisible by 12. What is the minimum value of (A + B)?

A. 4
B. 5
C. 3
D. 2 ✓

**Q20** Mathematics

Out of 1500 students in a school, 300 did not participate in the voting. Candidate X got 40% of the valid votes, and Candidate Y got 28% of the valid votes. What is the difference in votes between Candidate X and Candidate Y?

A. 240
B. 348
C. 144 ✓
D. 120

**Q21** Mathematics

Which of the following numbers is divisible by both 9 and 22?

A. 5152
B. 5544 ✓
C. 6464
D. 4642

**Q22** Mathematics

A wholesale fruit merchant purchased a crate of apples for ₹8,000 and sold it at a 25% profit. How much profit (in ₹) did the merchant earn?

A. 3,000
B. 2,500
C. 1,600
D. 2,000 ✓

**Q23** Mathematics

A shopkeeper bought six identical mobile phones for ₹75,000. He sold two of them for ₹54,000. What was his gain percentage on the two mobile phones sold?

A. 117%
B. 116% ✓
C. 119%
D. 118%

**Q24** Mathematics

The price of identical notebooks is constant. If the ratio of notebooks to cost is 8 : 64, and the same ratio is maintained for a purchase worth ₹40, how many notebooks can be bought?

A. 4
B. 6
C. 7
D. 5 ✓

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**Q25** Mathematics

If $15 \sin y + \cos y = \sqrt{15} \sin y$, find the value of $\tan y$.

A. $\frac{-16 - \sqrt{15}}{210}$

B. $\frac{-15 - \sqrt{15}}{220}$

C. $\frac{-15 - \sqrt{15}}{210}$ ✓

D. $\frac{-15 - \sqrt{15}}{215}$

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## Mathematics

25 Questions • Answer Key

**Q1** Mathematics

The sides of $a$ triangle are $10$ units, $9$ units, and $x$ units. Find the value of $x$ for which the area of the triangle is maximum.

A. $\sqrt{151}$

B. $\sqrt{171}$

C. $\sqrt{181}$ ✓

D. $\sqrt{161}$

**Q2** Mathematics

The sum of the present ages of Tony and Chris is 20 years. Four years ago from now, Chris's age was half of Tony's then age. How old (in years) is Tony at present?

A. 17

B. 5

C. 2

D. 12 ✓

**Q3** Mathematics

A person travels for some time at 37 km/hr and for the equal time at 58 km/hr. What is the average speed for the entire journey?

A. 48 km/hr

B. 47.5 km/hr ✓

C. 42 km/hr

D. 45.5 km/hr

**Q4** Mathematics

The numbers 27, 18, and 36 form a proportion. What is the fourth proportional?

A. 22

B. 24 ✓

C. 20

D. 26

**Q5** Mathematics

PQ ∥ RS and AB is the transversal that touches PQ at $X$ and RS at $Y$. If $\angle PXA = 120°$, then find $\angle PXY$.

A. 30°

B. 90°

C. 120°

D. 60° ✓

**Q6** Mathematics

Let x be a real number and Sin A = $\frac{x}{\sqrt{x^2+1}}$, tan B = $\frac{\sqrt{x^2+2}}{x}$. If $Sec^2$ A + $Cosec^2$ B = $\frac{85}{36}$, then what is the value of $32x^4+5$?

A. 11

B. 7 ✓

C. 9.6

D. 12

**Q7** Mathematics

A cylindrical pillar is 140 cm in diameter and 50 m in height. Find the cost of painting the curved surface of the pillar at the rate of ₹17 per $m^2$.
(Take $\pi = \frac{22}{7}$)

A. ₹3,761

B. ₹3,786

C. ₹3,697

D. ₹3,740 ✓

**Q8** Mathematics

A sum of ₹10,000 is invested at 10% per annum, for 2 years. What is the difference between the compound interest, compounded annually, and the simple interest earned at the end of 2 years?

A. ₹100 ✓

B. ₹150

C. ₹200

D. ₹50

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**Q9** Mathematics

A tap fills a tank in 6 hours. Another tap empties the full tank in 12 hours. How long (in hours) will it take to fill three-fourths of the tank, if the tank is empty initially and both the taps are opened together?

A. 27
B. 36
C. 18
D. 9 ✓

**Q10** Mathematics

If $4x + 5y = 174$ and $\frac{3x}{2y} = \frac{12}{11}$, then what is the value of $y^2 - x^2$?

A. 228 ✓
B. 208
C. 168
D. 154

**Q11** Mathematics

Given that $75^{0.58} = x$, $75^{0.76} = y$ and $x^z = y^9$, then the value of z is: (Round off to the nearest integer)

A. 14
B. 11
C. 13
D. 12 ✓

**Q12** Mathematics

Find the value of $\frac{\sqrt{\sec^2 A - 1}}{1 - \cot A} + \frac{\sqrt{\operatorname{cosec}^2 A - 1}}{1 - \tan A} - 1 - \sqrt{\sec^2 A - 1} - \sqrt{\operatorname{cosec}^2 A - 1} + 4(\sec^2 A - \tan^2 A)$.

A. tan A
B. 4 ✓
C. tan A + cot A
D. 3

**Q13** Mathematics

A sum of ₹5,000 is kept in a fixed deposit account for 3 years at a compound interest rate of 6% per annum, compounded half-yearly. What will be the maturity amount (rounded off to the nearest integer)?

A. ₹6,100
B. ₹6,050
C. ₹5,940
D. ₹5,970 ✓

**Q14** Mathematics

A shopkeeper marks his goods at a certain percentage above cost price. After offering a 15% discount on the marked price, he earns a profit of 5%. What percentage above the cost price did he mark his goods? (Round off the answer to two decimal places.)

A. 30.37%
B. 23.53% ✓
C. 17.04%
D. 20.28%

**Q15** Mathematics

A company team of 16 members has an average age of 40 years, while another team of 4 members has an average age of 30 years. What is the combined average age of all 20 team members?

A. 40 years
B. 38 years ✓
C. 34 years
D. 36 years

**Q16** Mathematics

Anand, Arvind and Navdeep entered in a partnership and invested in the ratio 8 : 10 : 9. At the end of the business term, they shared their total profit in the ratio 10 : 11 : 15. Find the ratio of time for which they invested.

A. 85 : 66 : 100
B. 75 : 66 : 100 ✓
C. 75 : 66 : 90
D. 75 : 76 : 100

**Q17** Mathematics

You want to design a cube-based art sculpture with a total visible surface area of 150 square centimeters. If only three faces of the cube will be visible, what should be the edge length of the cube (in centimeters)?

A. $2\sqrt{5}$
B. 5
C. $5\sqrt{2}$ ✓
D. $7\sqrt{2}$

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**Q18** Mathematics

The number 16611 is divisible by which of the following numbers?

A. 54

B. 55

C. 49 ✓

D. 42

**Q19** Mathematics

A shopkeeper blends two varieties of rice priced at ₹50 per kg and ₹70 per kg in the ratio 3:2. If the mixture is sold at ₹66 per kg, what is the profit percentage? (Round off your answer to two decimal places.)

A. 13.79% ✓

B. 10.48%

C. 8.23%

D. 15.62%

**Q20** Mathematics

A shopkeeper bought six identical mobile phones for ₹75,000. He sold two of them for ₹66,000. What was his gain percentage on the two mobile phones sold?

A. 165%

B. 164% ✓

C. 166%

D. 167%

**Q21** Mathematics

A freelancer spends 72% of his monthly income and saves the rest. If his monthly income is ₹25,000, then how much does he save each month (in ₹)?

A. 6,500

B. 7,000 ✓

C. 8,000

D. 7,500

**Q22** Mathematics

A person invested ₹56,500 at a rate of 6% per annum simple interest for 4 years. Find the amount (in ₹) he will receive after 4 years.

A. 70,060 ✓

B. 72,060

C. 72,600

D. 70,600

**Q23** Mathematics

Find the value of $\frac{3.8^4 - 4.9^4}{3.8^2 + 4.9^2}$

A. -7.56

B. 1.18

C. -9.57 ✓

D. 8.75

**Q24** Mathematics

A car's radiator should contain a solution of 62% antifreeze. A motorist has 13 litres of 33% antifreeze. How many litres (rounded off to 2 decimal places) of 97% antifreeze liquid should he add to his solution to produce a 62% antifreeze?

A. 7.76

B. 14.64

C. 13.29

D. 10.77 ✓

**Q25** Mathematics

Find the median for the following grouped data.

| Class Interval | 15-23 | 23-31 | 31-39 | 39-47 | 47-55 |
|---|---|---|---|---|---|
| Frequency | 3 | 7 | 10 | 6 | 4 |

A. 36

B. 35 ✓

C. 28

D. 24

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## Mathematics

25 Questions • Answer Key

**Q1** Mathematics

The marked price of a chair is ₹2000. If two successive discounts of 15% and 10% are given, what is the final price paid by the customer?

A. ₹1600
B. ₹1500
C. ₹1530 ✓
D. ₹1550

**Q2** Mathematics

If the mean proportional between two numbers is 24 and one of the numbers is 6, what is the other number?

A. 48
B. 96 ✓
C. 144
D. 12

**Q3** Mathematics

A car's radiator should contain a solution of 62% antifreeze. A motorist has 6 litres of 21% antifreeze. How many litres (rounded off to 2 decimal places) of 71% antifreeze liquid should he add to his solution to produce a 62% antifreeze?

A. 30.46
B. 23.51
C. 27.33 ✓
D. 29.31

**Q4** Mathematics

AB is parallel to CD. A transversal PQ intersects AB and CD at E and F, respectively, and ∠PEB = 69°. G is a point between AB and CD such that ∠BEG = 33° and ∠GFE = 17°. What is the measure of ∠EGF?

A. 93°
B. 85° ✓
C. 71°
D. 86°

**Q5** Mathematics

A solid right circular cone has base radius 6 cm and height 8 cm. It is completely melted and the metal is recast into small solid spheres, each of radius 2 cm.
What is the maximum number of complete spheres that can be made? (Use π = 22/7)

A. 12
B. 10
C. 9 ✓
D. 8

**Q6** Mathematics

A parent invests a certain amount in a children's future fund at 10% per annum. After 2 years, the maturity amount under compound interest, compounded annually is ₹50 more than it would have been under simple interest. Find the original investment (in ₹).

A. 2,500
B. 12,500
C. 5,000 ✓
D. 10,000

**Q7** Mathematics

The cost of a bag is raised by 15% in January and then by 5% in February. If the original cost was ₹800, what is the price after both increases?

A. ₹1000
B. ₹900
C. ₹960
D. ₹966 ✓

**Q8** Mathematics

PQRS is a trapezium in which PQ is parallel to SR. The perpendicular from Q meets SR at T. The lengths of non-parallel sides, PS = QR = 24 cm and ∠QRT = 45°, then find the distance of PQ from SR.

A. $25\sqrt{2}$cm
B. 6 cm
C. $24\sqrt{3}$cm
D. $12\sqrt{2}$cm ✓

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**Q9** Mathematics

A shopkeeper sells sugar at ₹100 in July, ₹80 in August, and ₹120 in September. If the quantities sold were 10 kg, 16 kg, and 14 kg, respectively, what is the average selling price per kg across these months?

A. ₹105

B. ₹99 ✓

C. ₹98

D. ₹95

**Q10** Mathematics

Yashraj is three times as old as his son, and his daughter is 3 years younger than the son. If the sum of the ages of these three people 3 years ago was 93 years, then Yashraj's present age (in years) is:

A. 79

B. 73

C. 85

D. 63 ✓

**Q11** Mathematics

The value of $2\,\text{cosec}^2 31° \cot^2 59° - \sin^2 31° - \sin^2 59° - \cot^2 59°$ is equal to:

A. $\sec^2 31°$ ✓

B. $\cot^2 31°$

C. $\sec^2 59°$

D. $\tan^2 59°$

**Q12** Mathematics

Which of the following numbers is divisible by both 35 and 9?

A. 32150

B. 30870 ✓

C. 30440

D. 31578

**Q13** Mathematics

A student has 2 tests of 80 marks each and 3 assignments of 60 marks each. What is the weighted arithmetic mean of these marks?

A. 68 ✓

B. 70

C. 64

D. 72

**Q14** Mathematics

Simplify: $75-\{18 \div 3 \times (4+2)-5 \times 3\} + 28 \div 7$

A. 58 ✓

B. 56

C. 52

D. 54

**Q15** Mathematics

A man invests ₹56,500 at a simple interest rate of 10% per annum for 2 years. Find the amount (in ₹) he will receive at the end of 2 years.

A. 67,800 ✓

B. 67,080

C. 64,080

D. 64,800

**Q16** Mathematics

A car covers a distance of 840 km in 5 hours. The speed of a train is double the speed of the car. One-third the speed of the train is equal to the speed of a bike. How much distance will the bike cover in 3 hours?

A. 336 km ✓

B. 339 km

C. 331 km

D. 329 km

**Q17** Mathematics

Three business partners P, Q, and R invest capitals of ₹4,40,000, ₹1,50,000 and ₹2,00,000, respectively, in a business. They are entitled to 5% per annum interest on their capitals before the division of profit. The remaining profit after paying interest on capital is to be distributed among them in the ratio of their capitals. At the end of the year, they make a total profit of ₹1,11,232. Find the share of profit received by R.

A. ₹28,160 ✓

B. ₹35,620

C. ₹47,452

D. ₹18,160

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**Q18** Mathematics

A tap fills a tank in 6 hours. Another tap empties the full tank in 7 hours. How long (in hours) will it take to fill half of the tank, if the tank is empty initially and both the taps are opened together?

A. 14

B. 21 ✓

C. 28

D. 42

**Q19** Mathematics

A shopkeeper buys 57 dozen articles at ₹720 per dozen. He sells each article for ₹81. What is his profit percentage?

A. 35% ✓

B. 33%

C. 37%

D. 34%

**Q20** Mathematics

The sum of the ages of Stan and Benedict is 98 years. Four years ago, Benedict's age was half of Stan's then age. How old (in years) is Stan at present?

A. 63

B. 62

C. 68

D. 64 ✓

**Q21** Mathematics

A trader purchases an item for ₹200, sells it to a retailer for ₹220, who then sells it to a customer for ₹242. What is the total profit percentage from the original purchase price to the final selling price?

A. 22%

B. 10%

C. 20%

D. 21% ✓

**Q22** Mathematics

The 7-digit number 54A177B is divisible by 12. What is the minimum value of (A + B)?

A. 6

B. 7

C. 4

D. 3 ✓

**Q23** Mathematics

Find the compound interest on ₹4,450 at the rate of 20% per annum, compounded half-yearly, for 1 year.

A. ₹967.25

B. ₹914.50

C. ₹985.25

D. ₹934.50 ✓

**Q24** Mathematics

The volume of a cylinder having diameter 16 cm and height 21 cm is:

$\pi = \frac{22}{7}$

A. 4182 $cm^3$

B. 4311 $cm^3$

C. 4224 $cm^3$ ✓

D. 4189 $cm^3$

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**Q25** Mathematics

If $7 \sin y + \cos y = \sqrt{4} \sin y$, find the value of $\tan y$.

A. $-\frac{1}{5}$

B. $-\frac{1}{4}$

C. $-\frac{1}{1}$

D. $-\frac{1}{13}$

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## Mathematics

25 Questions • Answer Key

**Q1** Mathematics

A person invested ₹56,500 at a rate of 8% per annum simple interest for 2 years. Find the amount (in ₹) he will receive after 2 years.

- A. 65,540 ✓
- B. 65,450
- C. 64,450
- D. 64,540

**Q2** Mathematics

The diameter PQ of a circle with centre O is perpendicular to a chord RS at point M. Point Q is in the minor segment and P is in the major segment. If RS = 32 cm and QM = 6 cm, what is the length of PM (in cm)?

- A. $48\frac{2}{3}$
- B. $42\frac{2}{3}$ ✓
- C. $24\frac{2}{3}$
- D. $32\frac{2}{3}$

**Q3** Mathematics

A merchant mixes 30 kg of rice costing ₹40 per kg with 20 kg of rice costing ₹60 per kg. What is the average price per kg of the resulting mixture?

- A. ₹52
- B. ₹45
- C. ₹50
- D. ₹48 ✓

**Q4** Mathematics

Aman is three times as old as his son, and his daughter is 3 years younger than the son. If the sum of the ages of these three people 3 years ago was 108 years, then Aman's present age (in years) is:

- A. 72 ✓
- B. 70
- C. 59
- D. 48

**Q5** Mathematics

Simplify: $3-\sqrt{5}+\frac{1}{\sqrt{5}-\sqrt{3}}+\frac{1}{\sqrt{5}-\sqrt{3}}$.

- A. $2+\sqrt{5}$
- B. $3+\sqrt{3}$ ✓
- C. $\sqrt{3}-\sqrt{5}$
- D. $3$

**Q6** Mathematics

A can lay a railway track between two given stations in 7 days and B can do the same job in 63 days. With the help of C, they do the job in 6 days only. Then, C alone can do the job in:

- A. 126 days ✓
- B. 129 days
- C. 128 days
- D. 127 days

**Q7** Mathematics

If $8b-\frac{1}{5b}=8$, then what is the value of the expression $25b^2+\frac{1}{64b^2}$?

- A. $\frac{120}{7}$
- B. $\frac{80}{49}$
- C. $\frac{105}{4}$ ✓
- D. $\frac{7}{4}$

**Q8** Mathematics

A car's radiator should contain a solution of 84% antifreeze. A motorist has 10 litres of 70% antifreeze. How many litres (rounded off to 2 decimal places) of 95% antifreeze liquid should he add to his solution to produce a 84% antifreeze?

- A. 18.61
- B. 15.38
- C. 12.73 ✓
- D. 10.34

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**Q9** Mathematics

A pair of shoes is marked at ₹2000. During a festival sale, a shopkeeper offers a 30% discount. What is the amount of discount given?

A. ₹500
B. ₹700
C. ₹600 ✓
D. ₹800

**Q10** Mathematics

Simplify: $\frac{52^2 - 12^3}{4^3 - 16 \times 3}$

A. 66
B. 72
C. 61 ✓
D. 57

**Q11** Mathematics

P, Q and R start a business with investments in the ratio 2 : 3 : 5. If P's share of the annual profit is ₹4,000, what is the total profit?

A. ₹18,000
B. ₹15,000
C. ₹20,000 ✓
D. ₹25,000

**Q12** Mathematics

A shopkeeper bought six identical mobile phones for ₹75,000. He sold two of them for ₹34,000. What was his gain percentage on the two mobile phones sold?

A. 35%
B. 36% ✓
C. 39%
D. 37%

**Q13** Mathematics

The value of $\tan^4\theta + (2 - \sec^2\theta)\tan^2\theta + 2 - \sec^2\theta$ is:

A. −1
B. 0
C. 1 ✓
D. 2

**Q14** Mathematics

The 7-digit number 49A952B is divisible by 12. What is the minimum value of (A + B)?

A. 2
B. 3
C. 4
D. 1 ✓

**Q15** Mathematics

Three friends, A, B, and C, invest in the ratio 2:3:5 in a business. If the total profit is ₹1,00,000, how much more does C get than A?

A. ₹10,000
B. ₹40,000
C. ₹20,000
D. ₹30,000 ✓

**Q16** Mathematics

Let AB and CD be two parallel lines, with AB above CD. Let EF and GH be two parallel transversals intersecting AB at P and R, respectively, and CD at Q and S, respectively. Assume that E and G lie above AB, while F and H lie below CD. If ∠EPB = 2a°, ∠DSG = b° and ∠FQD = 80°, then find the values for a and b, respectively.

A. 20 and 80
B. 50 and 100 ✓
C. 40 and 100
D. 40 and 120

**Q17** Mathematics

A sum was invested at 12% per annum for 2 years. The difference between compound interest, compounded annually, and simple interest earned on the sum after 2 years is ₹101.76. What was the principal amount (rounded off to two decimal places)?

A. ₹6,842.48
B. ₹7,680.82
C. ₹6,050.23
D. ₹7,066.67 ✓

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**Q18** Mathematics

A wooden box in the shape of a cuboid has internal dimensions 19.8 cm × 13.2 cm × 8.8 cm. It is completely filled with small cubic blocks, each of side 2.2 cm. Find the number of cubes that can completely fill the box.

- A. 216 ✓
- B. 200
- C. 232
- D. 256

**Q19** Mathematics

Find the compound interest on ₹8,680 for one year at 10% per annum, interest payable half yearly (rounded off to the nearest rupees).

- A. ₹850
- B. ₹840
- C. ₹880
- D. ₹890 ✓

**Q20** Mathematics

If cosec 43° = x, then the value of $[\frac{1}{\text{cosec}^2 47°} + \sin^2 43° + \tan^2 47° - \frac{1}{\sin^2 47° \sec^2 43°}]$ is:

- A. $2x^2 - 3$
- B. $2x + 3$
- C. $x^2 - 1$ ✓
- D. $x^2 + 1$

**Q21** Mathematics

Two trains with lengths $148\ m$ and $156\ m$ , respectively, are moving towards each other. Their speeds are $17.5\ m/s$ and $20.5\ m/s$, respectively. What will be the time required by the trains to cross each other?

- A. 7 seconds
- B. 8 seconds ✓
- C. 9 seconds
- D. 10 seconds

**Q22** Mathematics

A shopkeeper buys a pen for ₹100 and sells it for ₹150. What is the profit percentage?

- A. 48%
- B. 45%
- C. 50% ✓
- D. 40%

**Q23** Mathematics

If a candidate received 55% of the 2,20,000 votes in an election, what was the total number of votes the candidate received?

- A. 1,10,000
- B. 1,21,000 ✓
- C. 1,15,000
- D. 1,30,000

**Q24** Mathematics

The weekly wages (in ₹) of 7 workers are ₹1200, ₹1300, ₹1100, ₹1400, ₹1250, ₹1350, ₹1150. What is the median wage?

- A. ₹1300
- B. ₹1350
- C. ₹1250 ✓
- D. ₹1200

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**Q25** Mathematics

The volume of a cylinder having diameter 30 cm and height 49 cm is:

$\pi = \frac{22}{7}$

A. 34650 $cm^3$ ✓

B. 34569 $cm^3$

C. 34725 $cm^3$

D. 34606 $cm^3$

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## Mathematics

25 Questions • Answer Key

**Q1** Mathematics

Simplify: $(\frac{9x^2 - 68xy + 64y^2}{3x - 8y} - 3x + 8y + \frac{10xy}{3x - 8y})(\frac{64y^2 - 9x^2}{3x + 8y})$

- A. 10xy ✓
- B. 3x + 8y
- C. 3x – 8y
- D. −10xy

**Q2** Mathematics

A car's radiator should contain a solution of 84% antifreeze. A motorist has 4 litres of 54% antifreeze. How many litres (rounded off to 2 decimal places) of 95% antifreeze liquid should he add to his solution to produce a 84% antifreeze?

- A. 6.85
- B. 16.93
- C. 10.91 ✓
- D. 14.46

**Q3** Mathematics

A man has invested ₹56,500 at a rate of 8% per annum simple interest for 3 years. Find the amount (in ₹) that he will receive after 3 years.

- A. 69,600
- B. 69,060
- C. 70,060 ✓
- D. 70,600

**Q4** Mathematics

What will be the total cost (in ₹) of polishing the curved surface of a wooden cylinder at a rate of ₹165 per $m^2$, if it has 20 cm radius and 7 m height?

- A. 1,245
- B. 1,452 ✓
- C. 1,524
- D. 2,145

**Q5** Mathematics

Find the value of $m$ which sastisfies the equation:
$(\frac{11}{3})^3 \times (\frac{3}{11})^{13} \times (\frac{11}{3})^6 = (\frac{3}{11})^{3m+11}$

- A. $\frac{5}{3}$
- B. $-\frac{5}{3}$
- C. $-\frac{7}{3}$ ✓
- D. $\frac{7}{3}$

**Q6** Mathematics

After replacing old appliances with energy-efficient models, a household reduced its monthly electricity consumption by 15%. If it previously consumed 400 units of electricity per month, how many units does it consume now?

- A. 365
- B. 340 ✓
- C. 345
- D. 300

**Q7** Mathematics

Roshan runs from point A to point B at a speed of 25 km/h and returns from point B to point A at 31 km/h. Find the average speed for the entire trip (rounded off to two decimal places).

- A. 27.68 km/h ✓
- B. 27.49 km/h
- C. 27.84 km/h
- D. 27.32 km/h

**Q8** Mathematics

A movie received ratings from two groups of viewers. Forty viewers gave an average rating of 8 points, while sixty viewers gave an average rating of 7 points. What was the overall average rating?

- A. 7.2
- B. 7.4 ✓
- C. 7.5
- D. 7.6

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**Q9** Mathematics

A premium headphone was available for ₹15,300 after successive discounts of 15% followed by 10% on its marked price. What was its marked price (in ₹)?

- A. 20,000 ✓
- B. 21,000
- C. 18,000
- D. 19,500

**Q10** Mathematics

Which of the following numbers is divisible by both 19 and 46?

- A. 15005
- B. 17039
- C. 16606 ✓
- D. 17849

**Q11** Mathematics

Evaluate the following.

$$\frac{\sin^2\theta - 2\sin^4\theta}{2\cos^3\theta - \cos\theta}$$

- A. tanθsinθ ✓
- B. tanθsecθ
- C. cosθcotθ
- D. cotθsinθ

**Q12** Mathematics

Find the curved surface area (in $cm^2$) of the cylinder of radius 6 cm and height 14 cm. (Use π = 22/7)

- A. 522
- B. 528 ✓
- C. 526
- D. 524

**Q13** Mathematics

AB and CD are two parallel lines. Another line EF cuts these parallel lines at M and N, respectively. The bisectors of angles BMN and MND meet at the point P. Which of the following statements is true?

- A. MNP is a right-angled triangle with right angle at P. ✓
- B. MNP is a right-angled triangle with right angle at M.
- C. MNP is a right-angled triangle with right angle at N.
- D. MNP is not a right-angled triangle.

**Q14** Mathematics

A shopkeeper buys 78 dozen articles at ₹168 per dozen. He sells each article for ₹35. What is his profit percentage?

- A. 150% ✓
- B. 130%
- C. 140%
- D. 160%

**Q15** Mathematics

A machine originally costs ₹25,000. If the rate of depreciation is 4% per annum, find the value of the machine after two years.

- A. ₹24,400
- B. ₹23,040 ✓
- C. ₹23,400
- D. ₹24,040

**Q16** Mathematics

A sum is invested at compound interest (compounded annually) at 12% per annum. If it amounts to ₹25,088 after 2 years, what was the sum invested?

- A. ₹21,000
- B. ₹20,000 ✓
- C. ₹19,000
- D. ₹22,000

**Q17** Mathematics

A store stocks two types of digital storage devices, X and Y, in the ratio 3 : 8. If 24 devices are of type X, by how many does the number of type Y devices exceed type X devices?

- A. 48
- B. 64
- C. 32
- D. 40 ✓

**Q18** Mathematics

In a school, Class X is divided into three sections: A, B, and C. The ratio of students in sections A and B is 1 : 3, and the ratio of students in sections B and C is 4 : 5. If the total number of students in Class X is 341, how many students are there in Section A?

- A. 42
- B. 44 ✓
- C. 40
- D. 46

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**Q19** Mathematics

A mobile accessories retailer cleared a batch of unsold chargers during an end-of-season sale. The batch had originally cost ₹6,000 but was sold for ₹5,700 to free up shelf space. What was the retailer's loss (in ₹)?

A. 280
B. 290
C. 320
D. 300 ✓

**Q20** Mathematics

A circle of diameter 50 cm has two equal parallel chords of length 14 cm each separated by a distance y cm. Find the value of y.

A. 24
B. 28
C. 48 ✓
D. 36

**Q21** Mathematics

Simplify the following-
$(6561)^{0.18} \times (6561)^{0.07}$

A. 9 ✓
B. 5
C. 4
D. 6

**Q22** Mathematics

A tap fills a tank in 8 hours, while another tap empties the full tank in 16 hours. If the tank is initially empty and both taps are opened together, how long (in hours) will it take to fill half of the tank?

A. 8 ✓
B. 12
C. 16
D. 24

**Q23** Mathematics

A school's attendance dashboard records the attendance for five consecutive days. The attendance on four days was 48, 50, 47, and 53 students. If the dashboard reports an average attendance of 50 students over all five days, what was the attendance on the fifth day?

A. 51
B. 50
C. 54
D. 52 ✓

**Q24** Mathematics

Simplify $(17pq + 16q)^2 - (17pq - 16q)^2$.

A. $1088pq^2$ ✓
B. $544pq^2$
C. $1088p^2q$
D. $544p^2q^2$

**Q25** Mathematics

If $12 \sin y + \cos y = \sqrt{8} \sin y$, find the value of $\tan y$.

A. $\frac{-12 - \sqrt{8}}{146}$
B. $\frac{-12 - \sqrt{8}}{136}$ ✓
C. $\frac{-12 - \sqrt{8}}{141}$
D. $\frac{-13 - \sqrt{8}}{136}$

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## Mathematics

25 Questions • Answer Key

**Q1** Mathematics

If a + b + c = 0, then find the value of $\frac{a^2}{a^2 - bc} + \frac{b^2}{b^2 - ca} + \frac{c^2}{c^2 - ab}$.

A. 0
B. 6
C. 4
D. 2 ✓

**Q2** Mathematics

A person invested ₹56,000 at a rate of 10% per annum simple interest for 3 years. Find the amount (in ₹) he will receive after 3 years.

A. 73,800
B. 71,800
C. 70,800
D. 72,800 ✓

**Q3** Mathematics

A digital polling agency reports that in a municipal election, Candidate X secured 65% of the total valid votes, while Candidate Y secured 35%. If 13,000 valid votes were cast, then by how many votes did Candidate X lead Candidate Y?

A. 3500
B. 4200
C. 2600
D. 3900 ✓

**Q4** Mathematics

A sum of money is divided among A, B, and C in the ratio 4:5:6. If C receives ₹2,400, how much does B receive?

A. ₹2,200
B. ₹1,600
C. ₹1,800
D. ₹2,000 ✓

**Q5** Mathematics

Which of the following numbers is divisible by both 11 and 24?

A. 17688 ✓
B. 16811
C. 19640
D. 19408

**Q6** Mathematics

In a circle, a chord of length 80 cm is at a distance of 9 cm from the centre. Find the diameter of the circle.

A. 85 cm
B. 86 cm
C. 82 cm ✓
D. 88 cm

**Q7** Mathematics

A cylindrical pillar is 84 cm in diameter and 25 m in height. Find the cost of painting the curved surface of the pillar at the rate of ₹25 per $m^2$.
(Take $\pi = \frac{22}{7}$)

A. ₹1,618
B. ₹1,698
C. ₹1,617
D. ₹1,650 ✓

**Q8** Mathematics

A dress is bought for ₹500 and sold at a loss of 10%. What is the selling price?

A. ₹450 ✓
B. ₹470
C. ₹480
D. ₹400

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**Q9** Mathematics

On a circular path of 1292 m, Sujata and Anjali start walking from the same point but in the opposite directions with speeds of 3.7 m/s and X m/sec, respectively. They will meet for the first time after 136 seconds. Find the value of X.

- A. 5.8 ✓
- B. 11.3
- C. 9.4
- D. 0.4

**Q10** Mathematics

A shopkeeper buys 41 dozen articles at ₹600 per dozen. He sells each article for ₹55. What is his profit percentage?

- A. 11%
- B. 10% ✓
- C. 9%
- D. 13%

**Q11** Mathematics

Find the value of $(\sin^4\theta - \cos^4\theta + 1)\sec^2\theta - 2\tan^2\theta$.

- A. 0 ✓
- B. 5
- C. 3
- D. 2

**Q12** Mathematics

An investor deposits ₹15,000 in a scheme that offers 7% compound interest for the first year and 8% compound interest for the second year, compounded annually. What is the total amount at the end of 2 years (in ₹)?

- A. 17,200
- B. 17,520
- C. 17,400
- D. 17,334 ✓

**Q13** Mathematics

A car's radiator should contain a solution of 47% antifreeze. A motorist has 15 litres of 28% antifreeze. How many litres (rounded off to 2 decimal places) of 65% antifreeze liquid should he add to his solution to produce a 47% antifreeze?

- A. 15.83 ✓
- B. 17.21
- C. 18.64
- D. 20.88

**Q14** Mathematics

In a moderately skewed distribution, the mean and median are in the ratio 5:4. If the mode is 8 less than the median, what is the value of the mode?

- A. 8 ✓
- B. 12
- C. 10
- D. 14

**Q15** Mathematics

If $12\sin y + \cos y = \sqrt{11}\sin y$, find the value of $\tan y$.

- A. $\frac{-12-\sqrt{11}}{138}$
- B. $\frac{-12-\sqrt{11}}{133}$ ✓
- C. $\frac{-12-\sqrt{11}}{143}$
- D. $\frac{-13-\sqrt{11}}{133}$

**Q16** Mathematics

If ₹5,000 is placed in a bank for 1 year at 6% interest compounded half-yearly, what is the total amount at the end of the year?

- A. ₹5,360.50
- B. ₹5,304.50 ✓
- C. ₹5,300.50
- D. ₹5,318.50

**Q17** Mathematics

If a shopkeeper wants the selling price after a 20% discount to increase from ₹600 to ₹750, by what percentage should the marked price be increased?

- A. 20%
- B. 25% ✓
- C. 15%
- D. 12.5%

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**Q18** Mathematics

Given that $33^{0.65}$ = x, $33^{0.84}$ = y and $x^z = y^5$, then the value of z is closest to:

A. 4.53

B. 6.46 ✓

C. 9.97

D. 8.95

**Q19** Mathematics

A tap fills a tank in 9 hours. Another tap empties the full tank in 18 hours. How long (in hours) will it take to fill half of the tank, if the tank is empty initially and both the taps are open together?

A. 18

B. 10

C. 9 ✓

D. 19

**Q20** Mathematics

The curved surface area and the total surface area of a cylinder are in the ratio 1 : 2. If the total surface area of the right cylinder is 616 sq. cm, then its volume is (take $\pi = \frac{22}{7}$):

A. 1088 $cm^3$

B. 1078 $cm^3$ ✓

C. 1120 $cm^3$

D. 1190 $cm^3$

**Q21** Mathematics

The sum of the present ages of Johnny and Billy is 65 years. Four years ago from now, Billy's age was half of Johnny's then age. How old (in years) is Johnny at present?

A. 49

B. 41

C. 50

D. 42 ✓

**Q22** Mathematics

Find the fourth proportional to 25, 40, and 60.

A. 86

B. 96 ✓

C. 84

D. 98

**Q23** Mathematics

In a Δ PQR, PS is the bisector of ∠P, meeting side QR at S. If PQ = 7.2 cm, QR = 7 cm, and QS = 3.6 cm, find PR.

A. 5.7 cm

B. 6.8 cm ✓

C. 3.5 cm

D. 4.6 cm

**Q24** Mathematics

A cricketer scored 30, 42, 28, 35, 50, 44, 31, 39, 40, and 41 runs in his ten matches. What is his average score (in runs) per match?

A. 38 ✓

B. 36

C. 42

D. 40

**Q25** Mathematics

Find the value of $48.3-[7+\frac{1}{7+\frac{1}{7}}]-[3+\frac{1}{3+\frac{1}{3}}]$

A. 37.86 ✓

B. 46.18

C. 38.30

D. 31.75

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## Mathematics

24 Questions • Answer Key

**Q1** Mathematics

The following are the pocket money amounts (in ₹) received by a group of students: 400, 600, 400, 800, 600, 400, 1000. What is the mode of the data?

A. ₹1000
B. ₹800
C. ₹600
D. ₹400 ✓

**Q2** Mathematics

A car's radiator should contain a solution of 51% antifreeze. A motorist has 9 litres of 23% antifreeze. How many litres (rounded off to 2 decimal places) of 97% antifreeze liquid should he add to his solution to produce a 51% antifreeze?

A. 5.48 ✓
B. 4.18
C. 10.39
D. 6.94

**Q3** Mathematics

A shopkeeper buys 60 dozen articles at ₹240 per dozen. He sells each article for ₹25. What is his profit percentage?

A. 35%
B. 20%
C. 25% ✓
D. 30%

**Q4** Mathematics

A person invested ₹56,000 at a rate of 10% per annum simple interest for 4 years. Find the amount (in ₹) he will receive after 4 years.

A. 80,400
B. 79,400
C. 78,400 ✓
D. 81,400

**Q5** Mathematics

A woman's monthly income is ₹50,000. She spends 25% on rent, 35% on food, and 20% on transportation, saving the remaining amount. How much does she save each month?

A. ₹12,500
B. ₹15,000
C. ₹10,000 ✓
D. ₹8,000

**Q6** Mathematics

The surface area of a sphere increases by 44 $cm^2$ when its radius increases by 0.5 cm. Find the original radius.
(Use $\pi = \frac{22}{7}$)

A. 4.25 cm
B. 4 cm
C. 3.25 cm ✓
D. 3.5 cm

**Q7** Mathematics

What is the value of x, if x is the mean proportional between 0.16 and 0.64?

A. 0.40
B. 0.32 ✓
C. 0.48
D. 0.24

**Q8** Mathematics

The diameter of a right circular cone is 14 m and its slant height is 11 m. Find its volume.
(Take $\pi = \frac{22}{7}$)

A. $108\sqrt{2}\ m^3$
B. $408\sqrt{2}\ m^3$
C. $208\sqrt{2}\ m^3$
D. $308\sqrt{2}\ m^3$ ✓

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**Q9** Mathematics

Given that $137^{0.61} = x$, $137^{0.25} = y$ and $x^z = y^6$, then the value of z is closest to:

A. 2.89

B. 2.46 ✓

C. 4.48

D. 4.17

**Q10** Mathematics

The difference between the compound interest (compounded annually) and simple interest on a certain sum for 2 years at 12% per annum is ₹57.60. Calculate the principal.

A. ₹4000 ✓

B. ₹3500

C. ₹3000

D. ₹4500

**Q11** Mathematics

The sides of a triangle are 7, 9 and x. For what value of x is the area of the triangle the maximum?

A. $\sqrt{140}$

B. $\sqrt{120}$

C. $\sqrt{110}$

D. $\sqrt{130}$ ✓

**Q12** Mathematics

Which of the following numbers is divisible by both 47 and 21?

A. 46676

B. 48363 ✓

C. 49923

D. 47390

**Q13** Mathematics

If $9\sec^2\theta - 6\tan^2\theta = 15$, θ is an acute angle, then find the value of $\operatorname{cosec}\theta$.

A. $\frac{2}{\sqrt{3}}$

B. $\sqrt{\frac{3}{2}}$ ✓

C. $\sqrt{\frac{2}{3}}$

D. $\frac{3}{\sqrt{2}}$

**Q14** Mathematics

The HCF and LCM of two numbers are 48 and 576 respectively. If one of the numbers is 192, find the other number.

A. 143

B. 136

C. 141

D. 144 ✓

**Q15** Mathematics

If the difference between compound interest, compounded annually, and simple interest on a certain sum for 2 years at 10% per annum is ₹21, what is the sum?

A. ₹2,000

B. ₹2,100 ✓

C. ₹2,200

D. ₹2,500

**Q16** Mathematics

Simplify $(2pq + 7q)^2 - (2pq - 7q)^2$.

A. $28p^2q^2$

B. $56pq^2$ ✓

C. $56p^2q$

D. $28pq^2$

**Q17** Mathematics

A man bought a chair for ₹350 and sold it at a loss of 10%. What was the selling price?

A. ₹315 ✓

B. ₹310

C. ₹300

D. ₹320

**Q18** Mathematics

A shopkeeper marks a shirt 50% above its cost price. He then offers two successive discounts of 10% and 20% on the marked price. If the final selling price is ₹432, what was the original cost price of the shirt?

A. ₹320

B. ₹360

C. ₹400 ✓

D. ₹280

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**Q19** Mathematics

A group of six friends spent the following amounts on lunch: ₹120, ₹135, ₹145, ₹150, ₹125, and x. If their average spending was ₹140, what is the value of x?

A. ₹155

B. ₹160

C. ₹165 ✓

D. ₹170

**Q20** Mathematics

In $\triangle$ ABC, DE $\parallel$ AC, where $D$ and $E$ are the points on sides AB and BC, respectively. If BD $= 10$ cm and AD $= 13$ cm, then what is the ratio of the area of $\triangle$ BDE to the trapezium ADEC?

A. 429:100

B. 101:430

C. 100:429 ✓

D. 430:101

**Q21** Mathematics

A started a business by investing ₹1,08,000. After 6 months, B joined him with a capital of ₹1,44,000. At the end of the year, they made a profit of ₹82,000. Find the profit share of B.

A. ₹30,000

B. ₹48,000

C. ₹46,000

D. ₹32,800 ✓

**Q22** Mathematics

If 2x + 5y = 18 and 2x – 5y = 2, find the value of xy.

A. 16

B. 9

C. 8 ✓

D. 12

**Q23** Mathematics

Find the value of $\frac{(\cot^2 A - \tan^2 A)(\sin^2 A - 1)(\cos^2 A - 1)}{(2\cos^2 A - 1)} + \frac{(1 + \cot^2 A)}{\sin A}$.

A. $1 - \text{cosec}^3 A$

B. $\sin^3 A + 1$

C. $1 + \text{cosec}^3 A$ ✓

D. $\sin^3 A - 1$

**Q24** Mathematics

A tap fills a tank in 9 hours, while another tap empties the full tank in 12 hours. If the tank is initially empty and both taps are opened together, how long (in hours) will it take to fill half of the tank?

A. 38

B. 36

C. 18 ✓

D. 19

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## Mathematics

25 Questions • Answer Key

**Q1** Mathematics

In △ABC, BD ⊥ AC at D and ∠DBC = 53°. E is a point on BC such that ∠CAE = 58°. What is the measure of ∠AEB?

- A. 95° ✓
- B. 81°
- C. 109°
- D. 87°

**Q2** Mathematics

A shop offers a 'Buy One Get Two Free' scheme on a shirt priced at ₹900 each. What is the effective price per shirt if a customer buys three shirts under this offer?

- A. ₹300 ✓
- B. ₹450
- C. ₹600
- D. ₹900

**Q3** Mathematics

Find the area of $a$ triangle whose sides are in the ratio of $7$: $12$:$14$, and perimeter is $264$ meters.

- A. $41\sqrt{2684}\ m^2$
- B. $48\sqrt{3135}\ m^2$ ✓
- C. $24\sqrt{1005}\ m^2$
- D. $32\sqrt{1956}\ m^2$

**Q4** Mathematics

Which of the following numbers is divisible by both 33 and 46?

- A. 82369
- B. 83018
- C. 83947
- D. 81972 ✓

**Q5** Mathematics

Given that $69^{0.63} = x$, $69^{0.6} = y$ and $x^z = y^2$, then the value of z is closest to:

- A. 3.4
- B. 1.9 ✓
- C. 3.7
- D. 1.3

**Q6** Mathematics

ABCD is a square. M is an external point towards side AB such that triangle MAB is an equilateral triangle. What is the value of ∠AMD + $\frac{1}{3}$∠MCD?

- A. $50^o$
- B. $60^o$
- C. $45^o$
- D. $40^o$ ✓

**Q7** Mathematics

The monthly salaries (in ₹) of five workers in a factory are 12,000, 15,000, 18,000, 17,000, and 16,000. What is the arithmetic mean of their salaries?

- A. ₹16,500
- B. ₹17,200
- C. ₹18,000
- D. ₹15,600 ✓

**Q8** Mathematics

A toy is sold for ₹180, gaining a profit of 20%. What was its cost price?

- A. ₹150 ✓
- B. ₹140
- C. ₹160
- D. ₹170

**Q9** Mathematics

A person invested ₹56,000 at a rate of 12% per annum simple interest for 2 years. Find the amount (in ₹) he will receive after 2 years.

- A. 69,440 ✓
- B. 66,440
- C. 67,440
- D. 68,440

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**Q10** Mathematics

A shopkeeper bought six identical mobile phones for ₹18,000. He sold two of them for ₹18,000. What was his gain percentage on the two mobile phones sold?

A. 150%

B. 200% ✓

C. 100%

D. 250%

**Q11** Mathematics

Shivraj is three times as old as his son, and his daughter is 3 years younger than the son. If the sum of the ages of these three people 3 years ago was 103 years, then Shivraj's present age (in years) is:

A. 68

B. 61

C. 69 ✓

D. 55

**Q12** Mathematics

If ₹2000 is invested for 2 years at an annual compound interest rate of 5% compounded annually, what is the compound interest earned at the end of 2 years?

A. ₹200

B. ₹190

C. ₹210

D. ₹205 ✓

**Q13** Mathematics

Simplify $(14pq + 7q)^2 - (14pq - 7q)^2$.

A. $392p^2q$

B. $196p^2q^2$

C. $196pq^2$

D. $392pq^2$ ✓

**Q14** Mathematics

A household purchases 4 kg of oil at ₹80 per kg and 6 kg of oil at ₹60 per kg. What is the weighted average price per kg of the oil?

A. ₹68 ✓

B. ₹58

C. ₹88

D. ₹78

**Q15** Mathematics

Find the value of $\sec A + \sin A(1 + \tan A) + \cos A(1 + \cot A) - \sqrt{1 + \cot^2 A} + 1$.

A. $2\sec A+1$ ✓

B. $\sec A + \sin A$

C. $2\sec^2 A-1$

D. $\cos A + \operatorname{cosec} A$

**Q16** Mathematics

A car's radiator should contain a solution of 71% antifreeze. A motorist has 15 litres of 27% antifreeze. How many litres (rounded off to 2 decimal places) of 92% antifreeze liquid should he add to his solution to produce a 71% antifreeze?

A. 27.86

B. 31.43 ✓

C. 32.46

D. 33.99

**Q17** Mathematics

What is the nearest integer to 72979 that is divisible by 9?

A. 72980

B. 72981 ✓

C. 72978

D. 72977

**Q18** Mathematics

A vessel in the form of an inverted cone has a radius of 18 cm. This cone is partly filled with oil, which is dripping from a hole in the tip of the cone at a rate of 1 $cm^3$ in 45 minutes. In the beginning, the level of oil is 6 cm from top and the surface area of oil is 196π $cm^2$. How long (in hours) will it take the cone to be completely empty?

A. $1092\pi$

B. $1029\pi$ ✓

C. $1209\pi$

D. $1290\pi$

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**Q19** Mathematics

A wildlife reserve's forest cover increased by 5% annually for two years and then decreased by 10% in the third year due to a forest fire. If the present forest area is 99,225 hectares, what was the original forest area (in hectares) before these changes?

A. 99,000
B. 1,10,250
C. 99,750
D. 1,00,000 ✓

**Q20** Mathematics

A and B started a business in which B invests ₹1,80,000. At the end of the year, the total profit is ₹95,000, and A's share in the profit is ₹20,000. Find A's investment.

A. ₹44,000
B. ₹42,000
C. ₹46,000
D. ₹48,000 ✓

**Q21** Mathematics

An ant travels toward a food source. It covers 40% of the total distance at a speed of 60 feet/hour, and the remaining 60% at a speed of 90 feet/hour. What is the average speed of the ant for the entire journey?

A. 77 feet/hour
B. 76 feet/hour
C. 74 feet/hour
D. 75 feet/hour ✓

**Q22** Mathematics

A tap fills a tank in 6 hours. Another tap empties the full tank in 15 hours. How long (in hours) will it take to fill half of the tank, if the tank is empty initially and both the taps are opened together?

A. 10
B. 30
C. 15
D. 5 ✓

**Q23** Mathematics

If a mobile phone is sold at ₹12,000 after a 20% increase in its original price, what was its original price?

A. ₹9,000
B. ₹10,000 ✓
C. ₹11,000
D. ₹11,500

**Q24** Mathematics

If the ratio of A's salary to B's salary is 3:2 and A earns ₹18,000 per month, what is B's monthly salary?

A. ₹12,000 ✓
B. ₹15,000
C. ₹9,000
D. ₹10,000

**Q25** Mathematics

$A$ and $B$ are angles such that $0 < B < A < \frac{\pi}{2}$. If $\tan(A + B) = \sqrt{3}$ and $\cos(A - B) = \frac{\sqrt{3}}{2}$, then what is the value of $4\cos^2 A + 9\tan^2 2B$ ?

A. 6
B. 8.2
C. 5 ✓
D. 7.5

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## Mathematics

25 Questions • Answer Key

**Q1** Mathematics

A wildlife survey reported that the deer population in a reserve became 13,200 after a 10% annual increase. What was the deer population one year earlier?

- A. 12000 ✓
- B. 12120
- C. 14520
- D. 11880

**Q2** Mathematics

If $\tan(9x - 15)^\circ = \cot(8x + 20)^\circ$, then find the value of $x$.

- A. 8
- B. 10
- C. 5 ✓
- D. 4

**Q3** Mathematics

An event management company purchased tickets worth ₹12,000 and sold them to a booking partner at a 15% profit. The booking partner then sold the tickets at a 10% profit on the purchase price. What was the final selling price (in ₹)?

- A. 15,180 ✓
- B. 14,580
- C. 15,400
- D. 13,800

**Q4** Mathematics

Two trains, T and U, are moving towards each other on parallel tracks. Train T is 210 m long and is moving at 40 km/hr, while Train U is 240 m long and is moving at 50 km/hr. How long (in seconds) will it take for the two trains to cross each other from the moment they meet?

- A. 18 sec ✓
- B. 24 sec
- C. 21.6 sec
- D. 21 sec

**Q5** Mathematics

A person invested ₹56,000 at a rate of 12% per annum simple interest for 3 years. Find the amount (in ₹) he will receive after 3 years.

- A. 77,160
- B. 76,160 ✓
- C. 78,160
- D. 75,160

**Q6** Mathematics

Chords AB and CD of a circle intersect at a point T inside the circle. If AB = 27 cm, AT = 16 cm and TC = 20 cm, then CD (in cm) is equal to:

- A. 31.2
- B. 35.6
- C. 28.8 ✓
- D. 22.3

**Q7** Mathematics

A delivery van consumes 20 litres of diesel to travel 260 km. What is the van's average mileage (in km per litre)?

- A. 12
- B. 10
- C. 14
- D. 13 ✓

**Q8** Mathematics

If $4(\sec^2 59^\circ - \cot^2 31^\circ) + \frac{6\sqrt{2}}{7}\cos 45^\circ - 2\alpha \tan^2 56^\circ \times \tan^2 34^\circ = 2\alpha$, then the value of $\alpha$ is:

- A. $2\frac{5}{14}$
- B. $1\frac{3}{14}$ ✓
- C. $2\frac{3}{14}$
- D. $1\frac{5}{14}$

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**Q9** Mathematics

One pipe can fill a tank in 12 min while another pipe can empty completely filled tank in 14 min. If both the pipes are operated together on empty tank, how long (in min) will it take to fill two-third of the tank?

A. 224
B. 168
C. 112
D. 56 ✓

**Q10** Mathematics

The HCF of two numbers is 18, and their LCM is 360. If one of the numbers is 90, find the other number.

A. 90
B. 180
C. 120
D. 72 ✓

**Q11** Mathematics

Simplify $(14pq + 15q)^2 - (14pq - 15q)^2$.

A. $420p^2q^2$
B. $840pq^2$ ✓
C. $420pq^2$
D. $840p^2q$

**Q12** Mathematics

A food delivery company records the number of completed deliveries over seven days as 48, 50, 48, 46, x, 50, and 48, where x is a positive integer. If 48 remains the unique mode, determine the smallest possible value of x.

A. 46
B. 50
C. 1 ✓
D. 48

**Q13** Mathematics

A school plans to replace a rectangular garden measuring 49 m by 196 m with a square garden of the same area. What should be the side length (in metres) of the square garden?

A. 122
B. 98 ✓
C. 147
D. 70

**Q14** Mathematics

A river 10 m deep and 36 m wide is flowing at a speed of 2.7 km/hr. Find the amount of water (in $m^3$) that runs into the sea per minute.

A. 16,200 ✓
B. 12,000
C. 10,260
D. 12,600

**Q15** Mathematics

A rainwater harvesting tank is in the shape of a hemisphere of radius 3.5 m. During heavy rainfall, the tank gets completely filled. If the water from this tank is used to fill cylindrical buckets of radius 0.35 m and height 0.7 m, what is the maximum number of buckets that can be completely filled?

A. 373
B. 353
C. 313
D. 333 ✓

**Q16** Mathematics

A dress has a marked price of ₹1,200. What is the percentage discount if the selling price is ₹960?

A. 20% ✓
B. 30%
C. 25%
D. 15%

**Q17** Mathematics

In $a$ quadrilateral ABCD, the measure of $\angle A$ is $19°$ more than $\angle C$, $\angle B$ is $24°$ less than $\angle C$ and $\angle D$ is $8°$ more than twice the $\angle B$. Find the value of $\angle A + \angle D - \angle C$.

A. $141°$ ✓
B. $137°$
C. $108°$
D. $129°$

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**Q18** Mathematics

Which of the following numbers is divisible by both 46 and 41?

A. 62810
B. 60607
C. 62238 ✓
D. 63842

**Q19** Mathematics

An online learning platform reduced its annual subscription fee by 25% during an admission campaign and later increased the discounted subscription fee by 20%. If the original subscription fee was ₹8,000, what is the final subscription fee (in ₹)?

A. 7,600
B. 7,400
C. 7,200 ✓
D. 7,000

**Q20** Mathematics

A car's radiator should contain a solution of 63% antifreeze. A motorist has 4 litres of 23% antifreeze. How many litres (rounded off to 2 decimal places) of 99% antifreeze liquid should he add to his solution to produce a 63% antifreeze?

A. 6.05
B. 10.25
C. 4.44 ✓
D. 7.21

**Q21** Mathematics

A borrower repaid a loan through two equal yearly installments of ₹35,280 each, with the first installment due at the end of the first year. If interest was charged at 5% per annum compounded annually, what was the total interest paid (in ₹)?

A. 4,960 ✓
B. 4,640
C. 5,280
D. 4,800

**Q22** Mathematics

Find the fourth proportional of $\sqrt{48}$, $4\sqrt{3}$ and $\sqrt{169}$.

A. 14
B. $\sqrt{13}$
C. 13 ✓
D. $\sqrt{12}$

**Q23** Mathematics

A shopkeeper bought six identical mobile phones for ₹60,000. He sold two of them for ₹57,000. What was his gain percentage on the two mobile phones sold?

A. 185% ✓
B. 182%
C. 187%
D. 184%

**Q24** Mathematics

Hitesh is three times as old as his son, and his daughter is 3 years younger than the son. If the sum of the ages of these three people 3 years ago was 83 years, then Hitesh's present age (in years) is:

A. 57 ✓
B. 68
C. 64
D. 67

**Q25** Mathematics

The 7-digit number 43A762B is divisible by 12. What is the minimum value of (A + B)?

A. 3
B. 1
C. 2 ✓
D. 4

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