RRB ALP 2026 CBT-1

Assistant Loco Pilot · CEN 01/2026 · CBT-1 · Mathematics — Topic-wise

English

18 Chapters · 224 Questions · Official Answer Key

About this Compilation

Every **Mathematics** question asked across all 9 shifts of the **RRB ALP 2026 CBT-1** examination (CEN 01/2026), regrouped by **chapter** instead of by shift, so you can revise one topic end to end. The correct option is marked as per the official answer key.

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** to jump to any chapter (clickable).
- Within a chapter, questions on the same idea are placed together.
- The correct answer is highlighted in green with a tick.
- The same paper is also available complete and section-wise.



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Arithmetic

18 Questions • Answer Key

Q1 Divisibility

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 ✓

Q2 Divisibility

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

- A. 5152
- B. 5544 ✓
- C. 6464
- D. 4642

Q3 Divisibility

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

- A. 54
- B. 55
- C. 49 ✓
- D. 42

Q4 Divisibility

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

- A. 32150
- B. 30870 ✓
- C. 30440
- D. 31578

Q5 Divisibility

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 ✓

Q6 Divisibility

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 ✓

Q7 Divisibility

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

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

Q8 Divisibility

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

- A. 17688 ✓
- B. 16811
- C. 19640
- D. 19408

Q9 Divisibility

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

- A. 46676
- B. 48363 ✓
- C. 49923
- D. 47390

Q10 Divisibility

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

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

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Q11 Divisibility

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

A. 72980

B. 72981 ✓

C. 72978

D. 72977

Q12 Divisibility

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

A. 62810

B. 60607

C. 62238 ✓

D. 63842

Q13 Divisibility

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

Q14 Surds & Indices

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 ✓

Q15 Surds & Indices

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. $\frac{7}{3}$

Q16 Surds & Indices

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

Q17 Surds & Indices

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

Q18 Surds & Indices

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

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Arithmetic

6 Questions • Answer Key

Q1 BODMAS

Simplify:

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

- A. 75
- B. 25
- C. -15
- D. 69 ✓

Q2 BODMAS

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

- A. 58 ✓
- B. 56
- C. 52
- D. 54

Q3 BODMAS

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

- A. 66
- B. 72
- C. 61 ✓
- D. 57

Q4 BODMAS

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

Q5 Surds & Indices

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 Surds & Indices

Simplify the following-

$(6561)^{0.18} \times (6561)^{0.07}$

- A. 9 ✓
- B. 5
- C. 4
- D. 6

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Arithmetic

2 Questions • Answer Key

Q1 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 ✓

Q2 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 ✓

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Arithmetic 12 Questions • Answer Key

Q1 Basic

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

Q2 Basic

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 ✓

Q3 Basic

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

Q4 Basic

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

Q5 Basic

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

Q6 Elections

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

Q7 Elections

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

Q8 Elections

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 ✓

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Q9 Expenditure & Consumption

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

Q10 Population & Depreciation

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

Q11 Population & Depreciation

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 ✓

Q12 Population & Depreciation

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

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Q1 Discount

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

Q2 Discount

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

Q3 Discount

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

Q4 Discount

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

Q5 Discount

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

Q6 Discount

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

Q7 Discount

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%

Q8 Marked Price

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%

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Q9 Marked Price

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%

Q10 Profit & Loss

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 ✓

Q11 Profit & Loss

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%

Q12 Profit & Loss

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%

Q13 Profit & Loss

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%

Q14 Profit & Loss

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% ✓

Q15 Profit & Loss

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%

Q16 Profit & Loss

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%

Q17 Profit & Loss

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%

Q18 Profit & Loss

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 ✓

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Q19 Profit & Loss

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

Q20 Profit & Loss

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%

Q21 Profit & Loss

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%

Q22 Profit & Loss

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

Q23 Profit & Loss

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

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

Q24 Profit & Loss

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%

Q25 Profit & Loss

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

Q26 Profit & Loss

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%

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Q1 Compound Interest

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

Q2 Compound Interest

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

Q3 Compound Interest

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 ✓

Q4 Compound Interest

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 ✓

Q5 Compound Interest

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 ✓

Q6 Compound Interest

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

Q7 Compound Interest

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 ✓

Q8 Compound Interest

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

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Q9 Compound Interest

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 ✓

Q10 Compound Interest

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

Q11 SI vs CI

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

Q12 SI vs CI

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

Q13 SI vs CI

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 ✓

Q14 SI vs CI

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

Q15 SI vs CI

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 Simple Interest

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

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Q17 Simple Interest

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

Q18 Simple Interest

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

Q19 Simple Interest

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

Q20 Simple Interest

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

Q21 Simple Interest

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 ✓

Q22 Simple Interest

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

Q23 Simple Interest

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

Q24 Simple Interest

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

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Q1 Partnership

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

Q2 Partnership

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

Q3 Partnership

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

Q4 Partnership

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 ✓

Q5 Partnership

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 ✓

Q6 Partnership

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 ✓

Q7 Proportion

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 ✓

Q8 Proportion

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

A. 22
B. 24 ✓
C. 20
D. 26

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Q9 Proportion

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

Q10 Proportion

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

A. 86

B. 96 ✓

C. 84

D. 98

Q11 Proportion

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

Q12 Proportion

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

A. 14

B. $\sqrt{13}$

C. 13 ✓

D. $\sqrt{12}$

Q13 Ratio

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 ✓

Q14 Ratio

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 ✓

Q15 Ratio

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

Q16 Ratio

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 ✓

Q17 Ratio

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

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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

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%

Q3 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 ✓

Q4 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

Q5 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 ✓

Q6 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

Q7 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

Q8 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

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Q9 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

Q10 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

Q11 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

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Arithmetic 9 Questions • Answer Key

Q1 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

Q2 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

Q3 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

Q4 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

Q5 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 ✓

Q6 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

Q7 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

Q8 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

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Q9 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 ✓

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Arithmetic 9 Questions • Answer Key

Q1 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

Q2 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

Q3 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 ✓

Q4 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 ✓

Q5 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 ✓

Q6 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

Q7 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 ✓

Q8 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

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Q9 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

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Arithmetic 9 Questions • Answer Key

Q1 Pipes & Cisterns

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 ✓

Q2 Pipes & Cisterns

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 ✓

Q3 Pipes & Cisterns

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

Q4 Pipes & Cisterns

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

Q5 Pipes & Cisterns

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

Q6 Pipes & Cisterns

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

Q7 Pipes & Cisterns

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 ✓

Q8 Pipes & Cisterns

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 ✓

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Q9 Time & Work

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

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Arithmetic 8 Questions • Answer Key

Q1 Average Speed

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

Q2 Average Speed

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

Q3 Average Speed

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

Q4 Average Speed

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 ✓

Q5 Relative Speed

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

Q6 Speed & Distance

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

Q7 Trains

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

Q8 Trains

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

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Q1 Polygon / Combined figures

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.** $28\frac{21}{51}\%$

Q2 Quadrilateral

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

Q3 Triangle

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.** $\sqrt{161}$

Q4 Triangle

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.** $\sqrt{130}$ ✓

Q5 Triangle

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.** $32\sqrt{1956}\ m^2$

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Q1 Cone

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

Q2 Cone

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

Q3 Cone

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. $308\sqrt{2}\ m^3$ ✓

Q4 Cone

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. 1092π
- B. 1029π ✓
- C. 1209π
- D. 1290π

Q5 Cube & Cuboid

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. $7\sqrt{2}$

Q6 Cube & Cuboid

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

Q7 Cube & Cuboid

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

Q8 Cylinder

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 ✓

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Q9 Cylinder

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

Q10 Cylinder

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

Q11 Cylinder

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 ✓

Q12 Cylinder

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

Q13 Sphere & Hemisphere

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

Q14 Sphere & Hemisphere

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 ✓

Q15 Cylinder

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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Q16 Cylinder

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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Q1 Circles

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

Q2 Circles

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 Circles

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

Q4 Circles

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

Q5 Circles

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

Q6 Lines & Angles

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° ✓

Q7 Lines & Angles

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

A. 30°

B. 90°

C. 120°

D. 60° ✓

Q8 Lines & Angles

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°

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Q9 Lines & Angles

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

Q10 Lines & Angles

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.

Q11 Quadrilaterals & Polygons

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 ✓

Q12 Quadrilaterals & Polygons

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 ✓

Q13 Quadrilaterals & Polygons

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. $129°$

Q14 Triangles

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

Q15 Triangles

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

Q16 Triangles

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°

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Q1 Identities

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

Q2 Identities

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. $\frac{7}{4}$

Q3 Identities

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

Q4 Identities

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

A. $1088pq^2$ ✓

B. $544pq^2$

C. $1088p^2q$

D. $544p^2q^2$

Q5 Identities

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 ✓

Q6 Identities

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

A. $28p^2q^2$

B. $56pq^2$ ✓

C. $56p^2q$

D. $28pq^2$

Q7 Identities

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

A. $392p^2q$

B. $196p^2q^2$

C. $196pq^2$

D. $392pq^2$ ✓

Q8 Identities

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

A. $420p^2q^2$

B. $840pq^2$ ✓

C. $420pq^2$

D. $840p^2q$

Q9 Linear Equations

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

Q10 Linear Equations

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

A. 16

B. 9

C. 8 ✓

D. 12

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Q1 Ratios & Identities

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. $5 + \tan^2 A + \cot^2 A$

Q2 Ratios & Identities

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

Q3 Ratios & Identities

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

Q4 Ratios & Identities

The value of 2 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°

Q5 Ratios & Identities

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

Q6 Ratios & Identities

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

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

Q7 Ratios & Identities

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

Q8 Ratios & Identities

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

Q9 Ratios & Identities

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. $\frac{-13 - \sqrt{11}}{133}$

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Q10 Ratios & Identities

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

Q11 Ratios & Identities

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

B. $\sin^3 A + 1$

C. $1 + \operatorname{cosec}^3 A$ ✓

D. $\sin^3 A\text{-}1$

Q12 Ratios & Identities

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. $2\sec^2 A\text{-}1$

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

Q13 Ratios & Identities

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

Q14 Ratios & Identities

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

A. 8

B. 10

C. 5 ✓

D. 4

Q15 Ratios & Identities

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

A. $2\frac{5}{14}$

B. $1\frac{3}{14}$ ✓

C. $2\frac{3}{14}$

D. $1\frac{5}{14}$

Q16 Ratios & Identities

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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Q17 Ratios & Identities

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

Q18 Ratios & Identities

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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Statistics & Data

8 Questions • Answer Key

Q1 Mean, Median, Mode

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

Q2 Mean, Median, Mode

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

Q3 Mean, Median, Mode

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

Q4 Mean, Median, Mode

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

Q5 Mean, Median, Mode

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 ✓

Q6 Mean, Median, Mode

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 ✓

Q7 Mean, Median, Mode

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

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Q8 Mean, Median, Mode

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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