



रेलवे भर्ती बोर्ड / RAILWAY RECRUITMENT BOARD
सी ई एन - ०३/२०२६ - CEN - 03/2026
सेक्शन कंट्रोलर की भर्ती / Recruitment of Section Controller



RRB Section Controller 2026

Section Controller · CEN 03/2026 · CBT · Analytical and Mathematical — Topic-wise

English

31 Chapters · 240 Questions · Official Answer Key

About this Compilation

Every **Analytical and Mathematical** question asked across all shifts of the **RRB Section Controller 2026** examination (CEN 03/2026), 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.

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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Q1 Fare Linear Equations

A tourist bus charges a fixed boarding charge per trip, which is the same irrespective of the number or type of tickets purchased. The fare for a half ticket is 60% of the fare for a full ticket. For a particular trip, the total cost of one full ticket and one half ticket, including the boarding charge, is ₹2,400, and the total cost of two full tickets and one half ticket, including the same boarding charge, is ₹3,300. Find the fare of one full ticket and the boarding charge.

A. ₹900 and ₹960 ✓

B. ₹1,200 and ₹1,260

C. ₹800 and ₹860

D. ₹1,000 and ₹1,060

Q2 Infinite Solutions Condition

For which value of k will the following system of equations have infinitely many solutions?

$$4x - 6y = 8,$$

$$2x - 3y = k$$

A. 3

B. 4 ✓

C. 2

D. 5

Q3 Infinite Solutions Condition

Given the system of equations $2x + 3y = 7$ and $4x + ky = 14$, for which value of k will the system have infinitely many solutions?

A. 7

B. 6 ✓

C. 9

D. 3

Q4 Infinite solutions condition

Given the system: $2x + y + bz = 4$, $4x + 2y + 2bz = d$, $6x + 3y + 3bz = 12$, for which value of d does the system have infinite solutions?

A. $d = 4$ B. $d \neq 8$ C. $d = 12$ D. $d = 8$ ✓

Q5 Infinite solutions condition

For what value of k will the system of linear equations $2x + 3y - 7 = 0$ and $(k - 1)x + (k + 1)y = 2k + 4$ have infinitely many solutions?

A. 7

B. 5 ✓

C. 6

D. -4

Q6 Polynomial Simplification

Simplify: $x(7x - 8) + 4(x^2 - 4) + 15$

A. $11x^2 - 8x - 1$ ✓B. $11x^2 - 8x + 1$ C. $11x^2 + 8x + 1$ D. $-11x^2 - 8x + 1$

Q7 Polynomial Simplification

Simplify: $x(6x - 9) + 3(x^2 - 5) + 12$

A. $-9x^2 - 9x + 3$ B. $9x^2 + 9x + 3$ C. $9x^2 - 9x - 3$ ✓D. $9x^2 - 9x + 3$

Q8 Rows and Students

Students of a class are made to stand in rows. If 4 students are extra in each row, there would be 5 less rows. If two students are less in each row, there would be 4 more rows. Find the ratio between the number of rows and the number of students in the class.

A. 3 : 11

B. 1 : 12 ✓

C. 1 : 8

D. 12 : 17



Q9 Simultaneous linear equations

Three shop owners Anil, Bhanu and Charan do business in stationary items. One day, Anil sold one dozen pens and one dozen erasers, and purchased one dozen pencils. On the same day, Bhanu sold six dozen pens, four dozen pencils and five dozen erasers, whereas Charan sold five dozen pens and two dozen erasers and purchased two dozen pencils. The total transaction of these three people for that day on these items was, respectively, ₹200, ₹3,100 and ₹1,300. Find the cost of one pen.

A. ₹20

B. ₹30

C. ₹10

D. ₹25

**Q10 Simultaneous linear equations**

Given the system of equations is $3x + 2y + z = 19$, $x + 3y + 2z = 18$, and $2x + y + 3z = 17$, what is the value of $x + y + z$?

A. 5

B. 9



C. 7

D. 8

Q11 Three Variable Equations

Solve the system of equations:

$$x + y + z = 0$$

$$2x - y + 3z = 5$$

$$5x + 4y - 3z = 10$$

What is the value of $5xyz$?

A. 60

B. 30



C. 15

D. 45

Q12 Three Variable Equations

Which of the following ordered triples (x, y, z) satisfies all three equations: $x + 2y + 3z = 14$, $2x - y + z = 3$, $x + y - z = 3$?

A. (3,1,2)

B. (2,3,2)



C. (2,2,3)

D. (1,4,2)

Q13 Simultaneous linear equations

Solve the following system of equations for (x,y,z) .

$$3x + y + z = 0$$

$$x - 2y + 3z = 3$$

$$5x + 7y + 6z = 8$$

A. (1,1,1)

B. (-1,1,2)



C. (2,3,-1)

D. (2,1,3)



Algebra

9 Questions • Answer Key

Q1 Algebraic expression simplification

Simplify: $x(4x - 7) + 4(x^2 - 5) + 12$

A. $-8x^2 - 7x + 8$

B. $8x^2 - 7x + 8$

C. $8x^2 + 7x + 8$

D. $8x^2 - 7x - 8$ ✓

Q2 Algebraic expression simplification

Simplify: $x(9x - 6) + 4(x^2 - 3) + 19$

A. $13x^2 + 6x - 7$

B. $-13x^2 - 6x - 7$

C. $13x^2 - 6x - 7$

D. $13x^2 - 6x + 7$ ✓

Q3 BODMAS Simplification

Simplify: $12 \times 15 \div (90 \div 18) - 22 + 35 \times 3 \div 15$

A. 31

B. 21 ✓

C. 20

D. 19

Q4 BODMAS order

Simplify: $8 + 12 \div 4 \times 3 - 5$

A. 5

B. 12 ✓

C. 15

D. 11

Q5 Percentage Simplification

Simplify: 15% of 400 + 0.25 of 800 - 30

A. 245

B. 260

C. 250

D. 230 ✓

Q6 Square Root

What is the value of $\sqrt{1849}$?

A. 41

B. 43 ✓

C. 42

D. 44

Q7 Bracket Simplification

Evaluate $18 + 36 \div [2(5 + 4)] - 7$.

A. 12

B. 15

C. 14

D. 13 ✓

Q8 Squares and Roots

Simplify the expression: $\frac{(18^2 - 14^2) \times \sqrt{225}}{(10^2 - 6^2)}$

A. 20

B. 25

C. 38

D. 30 ✓



Simplify: $\sqrt{121} + \sqrt{324}$

A. 27

B. 26

C. 29



D. 28



Algebra

4 Questions • Answer Key

Q1 Laws of Indices

If $3^x \times 9^2 = 27^x$, what is the value of x ?

A. 3

B. 2



C. 4

D. 1

Q2 Index Simplification

If $x = 2^5 \cdot 3^3 \cdot 5^2$ and $y = 2^3 \cdot 3^5 \cdot 5^1$ then the value of $\frac{x^2 \cdot y^3}{2^{19} \cdot 3^{20} \cdot 5^7}$

A. 5

B. 2

C. 6

D. 3



Q3 Index Simplification

Simplify: $81^{\frac{3}{4}} \times 27^{\frac{2}{3}} \div 9^{\frac{5}{2}}$

A. 3

B. 2

C. 1



D. 0

Q4 Laws of indices

Find the value of $(2^3 \times 4^2) \div 2^2$.A. $2^3 \times 4^2$ B. $2^3 \times 2^2$ C. $4^2 \div 2^2$ D. $2^6 \div 2^2$ 

Arithmetic

3 Questions • Answer Key

Q1 Present age equations

The sum of Jaya's present age and four times Priya's present age is 45 years. Jaya's father is twice as old as Jaya, and Priya's brother is 3 years older than Priya. If the sum of the present ages of Jaya's father and Priya's brother is 51 years, what is the sum of the present ages (in years) of Priya and Jaya?

A. 22

B. 30

C. 29

D. 27



Q2 Present age equations

The sum of Riya's present age and 2 times Ayushi's present age is 62 years. Riya's father is presently 2 times as old as Riya. Ayushi's brother's present age is 4 years more than Ayushi's present age. The sum of the present ages of Riya's father and Ayushi's brother is 80 years. What is the sum of the present ages (in years) of Ayushi and Riya?

A. 34

B. 41

C. 46



D. 33

Q3 Present age equations

The sum of Naina's present age and 3 times Bhawna's present age is 60 years. Naina's father is presently 2 times as old as Naina. Bhawna's brother's present age is 4 years more than Bhawna's present age. The sum of the present ages of Naina's father and Bhawna's brother is 64 years. What is the sum of the present ages (in years) of Bhawna and Naina?

A. 30

B. 34

C. 33

D. 36



Arithmetic

14 Questions • Answer Key

Q1 Assumed mean method

The marks obtained by five students are 48, 52, 56, 60 and 64. Find the arithmetic mean using the assumed mean method.

A. 53

B. 55

C. 54

D. 56 ✓

Q2 Average after change

The average height of a group of 10 students is 133 cm. Two more students of height 157 cm and 187 cm joined the group, and 3 students of average height 184 cm leave the group. What is the new average height (in cm, rounded off to 1 decimal place) of the group after the changes?

A. 135.3

B. 124.7 ✓

C. 120.2

D. 117.4

Q3 Average after change

If the average of 5 numbers is 20 and each number is increased by 2, what will be the new average?

A. 18

B. 24

C. 22 ✓

D. 20

Q4 Average of Remaining

The average of 11 numbers is 86. If the first 7 numbers are 33, 38, 42, 90, 110, 77 and 20, then what will be the average of the remaining numbers?

A. 126

B. 130

C. 141

D. 134 ✓

Q5 Average of remaining numbers

The average of 12 numbers is 108. If the first 7 numbers are 40, 33, 43, 88, 103, 79 and 15, then what will be the average of the remaining numbers?

A. 188

B. 179 ✓

C. 184

D. 174

Q6 Joining Leaving Average

The average height of a group of 5 students is 165 cm. Two more students of heights 133 cm and 194 cm join the group and 4 students of average height 106 cm leave the group. What is the new average height (in cm, rounded off to 1 decimal place) of the group after the changes?

A. 245.7

B. 244.7

C. 247.3

D. 242.7 ✓

Q7 Missing Observation

If the average of six numbers is 24 and five of them are 18, 20, 25, 28, and 30, what is the sixth number?

A. 29

B. 23 ✓

C. 18

D. 26

Q8 Simple Average

A botanist is tracking the daily height changes of four rare plants. On Monday, the plants grow by 3 cm, 5 cm, 7 cm, and 9 cm, respectively. What is the average growth in centimeters among the four plants for that day?

A. 6 cm ✓

B. 5 cm

C. 8 cm

D. 7 cm



Q9 Simple Average

A student records the marks of four tests: 15, 21, 18, and 16. What is the arithmetic mean of these scores?

- A. 19.5
- B. 18
- C. 16
- D. 17.5

**Q10 Sum of consecutive numbers**

During a lab experiment, a researcher labels a sequence of test tubes so that each tube receives a consecutive natural number, starting from 13. If the researcher adds 18 tubes in total, what is the sum of the numbers on the labels of all tubes used?

- A. 459
- B. 507
- C. 585
- D. 387

**Q11 Weighted Average**

In a graduate-level statistics class, the following assignment scores and their corresponding weights are recorded:

Score	Weight
70	1
80	2
85	3
90	2
95	2

Find the weighted arithmetic mean of the scores.

- A. 90.0
- B. 84.0
- C. 78.5
- D. 85.5

**Q12 Weighted Average**

A college wants to calculate the average fee paid per student, considering that 30 students pay ₹20,000 each, 50 students pay ₹25,000 each, and 20 students pay ₹18,000 each. What is the weighted arithmetic mean fee per student?

- A. ₹20,000
- B. ₹22,100
- C. ₹25,000
- D. ₹24,000

**Q13 Weighted mean**

A student scores 70, 80 and 90 marks in three subjects having credits 2, 3 and 5, respectively. Find the weighted arithmetic mean.

- A. 82
- B. 83
- C. 81
- D. 84



Q14 Weighted mean

A company manufactures three types of products, A, B, and C. The production cost per unit and the number of units produced are given below:

Product	A	B	C
Cost per unit (₹)	120	150	200
Units produced	5x	3x	2x

Due to a revision in production plan, the units of A increase by 20%, those of B decrease by 10%, and those of C increase by 50%.

What is the new weighted average cost per unit (in ₹)? (Round off your answer to the nearest integer.)

A. 135

B. 140

C. 143

D. 147



Q1 Alligation Mixture

A car's radiator should contain a solution of 61% antifreeze. A motorist has 4 litres of 40% antifreeze. How many litres (rounded off to 2 decimal places) of 84% antifreeze liquid should he add to his solution to produce a 61% antifreeze?

- A. 2.34
- B. 9.57
- C. 1.58
- D. 3.65

**Q2 Alligation with Profit**

In what ratio must a grocer mix two varieties of rice worth ₹42 per kg and ₹115 per kg so that if he sells the mixture at ₹120 per kg he may gain 25%?

- A. 23:55
- B. 16:55
- C. 21:59
- D. 19:54

**Q3 Alligation with profit**

In what ratio must a grocer mix two varieties of rice worth ₹49 per kg and ₹121 per kg so that if he sells the mixture at ₹132 per kg, he may gain 32%?

- A. 7 : 17
- B. 11 : 12
- C. 9 : 22
- D. 13 : 19

**Q4 Alligation with profit**

In what ratio must a grocer mix two varieties of rice worth ₹91 per kg and ₹147 per kg so that if he sells the mixture at ₹150 per kg he may gain 25%?

- A. 27:29
- B. 12:7
- C. 22:25
- D. 26:27

**Q5 Mixture replacement**

A solution is made by mixing alcohol and water in the ratio 5 : 3. If 16 liters of the solution is taken out and replaced with pure water, and the new ratio becomes 1 : 1, how many liters of alcohol were present in the original solution?

- A. 45 liters
- B. 36 liters
- C. 50 liters
- D. 30 liters



Arithmetic

7 Questions • Answer Key

Q1 Ratio to Percentage

A mixture contains milk and water in the ratio 4 : 1. What percentage of the mixture is water?

A. 22%

B. 20% ☒

C. 18%

D. 24%

Q2 Savings calculation

Akshay's salary is ₹20,000 per month. He spends ₹4,500 on house rent, ₹2,000 on bills and the rest of the amount is his monthly savings. Find his savings in a year, if in the month of his birthday he spent his complete monthly saving for birthday celebration.

A. ₹1,48,500 ☒

B. ₹1,62,000

C. ₹1,35,000

D. ₹1,21,500

Q3 Savings calculation

Kanchan's salary is ₹20,000 per month. He spends ₹5,000 on house rent, ₹1,500 on bills and the rest of the amount is his monthly savings. Find his savings in a year, if in the month of his birthday he spent his complete monthly saving for birthday celebration.

A. ₹1,35,000

B. ₹1,62,000

C. ₹1,48,500 ☒

D. ₹1,21,500

Q4 Value from Percentage

If 10% of $x = 216$, then x is equal to:

A. 4320

B. 2260

C. 2160 ☒

D. 4420

Q5 Value from Percentage

If 10% of $x = 324$, then x is equal to:

A. 3240 ☒

B. 3340

C. 6480

D. 6580

Q6 Value from percentage

If 10% of $x = 192$, then x is equal to:

A. 1920 ☒

B. 3940

C. 2020

D. 3840

Q7 Value from percentage

If 10% of $x = 264$, then x is equal to:

A. 5280

B. 5380

C. 2740

D. 2640 ☒

Arithmetic

4 Questions • Answer Key

Q1 Outlet Opened Later

A tank is being filled by two inlet pipes, P and Q. P alone can fill the tank in 10 hours, and Q alone in 15 hours. Both pipes are opened together, but after 4 hours, an outlet pipe R is also opened which can empty the tank in 12 hours. How much total time (in hours) will it take to fill the tank?

A. 12

B. 8



C. 9

D. 10

Q2 Pipes Closed Midway

A tank is filled by two inlet pipes, A and B, and drained by a pipe C. Pipe A can fill the tank alone in 12 hours, pipe B can fill it alone in 18 hours, and pipe C can empty a full tank in 9 hours. All three pipes are opened at the same time, but pipe A is closed after 5 hours, and pipe C is closed 2 hours after pipe A is closed, while pipe B continues working without interruption. What is the total time required to completely fill the tank?

A. 25.5 hours

B. 23.5 hours

C. 22.5 hours

D. 24.5 hours



Q4 Pipes filling and emptying

If Pipe A can fill a tank in 10 hours, Pipe B fills it in 15 hours, and Pipe C empties the full tank 20 hours, what is the net fraction of the tank filled after all three pipes have operated for one hour?

A. $\frac{1}{10}$ B. $\frac{1}{5}$ C. $\frac{1}{6}$ D. $\frac{7}{60}$ 

Q3 Pipes with leak

Two pipes A and B can fill a cistern in 24 hours and 30 hours, respectively. When both are opened together, a leak at the bottom causes the filling time to increase by 3 hours and 12 minutes. The cistern starts empty, and pipes A, B, and the leak all remain active throughout. A drain pipe C, which can empty the cistern in 10 hours, is additionally opened only for the first 5 hours. What is the total time required to fill the cistern?

A. 16 hours 15 minutes

B. 15 hours 45 minutes

C. 21 hours 32 minutes



D. 12 hours 20 minutes



Arithmetic

25 Questions • Answer Key

Q1 Articles per rupee

A vendor sells 32 chocolates for ₹1 and earns a 50% profit. How many chocolates did he purchase for ₹1?

A. 48



B. 50

C. 54

D. 52

Q2 CP SP Change

A manufacturer fixes his selling price at 16% over the cost of production. If the cost of production goes up by 16%, and the manufacturer raises his selling price by 25%, find the profit percentage.

A. 26%

B. 25%



C. 28%

D. 23%

Q3 Changing investments

Three friends A, B, and C enter into a business with investments in the ratio 2 : 3 : 5. After 6 months, A increases his investment by 50%, B reduces his investment by 20%, while C keeps his investment unchanged. All the investments remain active in the business for a total duration of one year. What is the resulting ratio of their effective capital contributions?

A. 25:27:50



B. 25:27:52

C. 23:27:50

D. 25:23:50

Q4 Discount percentage

A clothing store tags a jacket with a marked price of ₹2,400. If a customer buys it for ₹2,040, what was the percentage discount offered?

A. 15%



B. 10%

C. 12%

D. 18%

Q5 Discount percentage

A dress has a marked price of ₹750. After a discount, the price paid is ₹675. What was the percentage discount given?

A. 12%

B. 15%

C. 10%



D. 8%

Q6 False Weight Profit

A shopkeeper claims to sell rock salt at ₹12 per kg, and its cost price is also ₹12 per kg. However, instead of delivering 1,285 g, he supplies only 514 g for the same price. What is his overall percentage profit?

A. 100%

B. 75%

C. 200%

D. 150%



Q7 False Weight Profit

A shopkeeper claims to sell rock salt at ₹16 per kg, while its cost price is ₹20 per kg. However, instead of delivering 1,010 g, he supplies only 505 g for the same price. What is his overall percentage profit?

A. 100%

B. 60%



C. 120%

D. 30%

Q8 False Weight Profit

A shopkeeper claims to sell rock salt at ₹37 per kg, which is also his cost price. However, instead of delivering 1,196 g, he supplies only 598 g while charging the same amount. What is his overall profit percentage?

A. 150%

B. 100%



C. 75%

D. 50%



Q9 False weight

A shopkeeper claims that he sells rock salt at ₹14 per kg, which costs him ₹40 per kg. But he gives 517 g instead of 1551 g. What is his percentage profit or loss?

- A. Loss of 4%
- B. Profit of 5% ✓
- C. Profit of 6%
- D. Loss of 2%

Q10 Markup and Discount

A trader purchased an article for ₹6,400. He marked it at 25% above the cost price and allowed a discount of 10% on the marked price. Find his profit.

- A. ₹960
- B. ₹800 ✓
- C. ₹720
- D. ₹640

Q11 Overhead Cost Profit

A shopkeeper buys an article for ₹15,000, spends 12% of the cost price on transport, then sells it to a customer at a 20% profit on the total cost. The customer later sells it at a 5% loss. What is the final selling price?

- A. ₹18,065
- B. ₹19,152 ✓
- C. ₹16,856
- D. ₹20,160

Q12 Partner Salary Share

A and B start a cafe with a capital of ₹6,300 and ₹1,200, respectively. After a year, out of the profit of ₹4,500, A gets his share of profit plus some money as his salary. In total, if A gets ₹4,500, what is the salary amount (in ₹) he received?

- A. 716
- B. 719
- C. 720 ✓
- D. 715

Q13 Partner Salary Share

A and B start a café by investing ₹1,800 and ₹6,800, respectively. At the end of one year, the café earns a profit of ₹8,600. A receives his share of the profit along with a separate salary, not paid out of the profit, for managing the café. If A receives a total of ₹3,000, what is the amount (in ₹) of his salary?

- A. 1,197
- B. 1,203
- C. 1,200 ✓
- D. 1,204

Q14 Profit Articles Count

A vendor sold 31 chocolates for ₹1, thereby making a profit of 100%. How many chocolates did he buy for ₹1?

- A. 64
- B. 68
- C. 66
- D. 62 ✓

Q15 Profit percent change

A merchant sells an item at a 15% profit. If the cost price increases by 10% and the selling price remains the same, what will be his new approximate profit percentage?

- A. 5.25%
- B. 0%
- C. 10%
- D. 4.55% ✓

Q16 Profit percent change

A manufacturer fixes his selling price at 70% over the cost of production. If the cost of production goes up by 60%, and the manufacturer raises his selling price by 60%, find the profit percentage.

- A. 73%
- B. 69%
- C. 72%
- D. 70% ✓



Q17 Single Discount

A shopkeeper marks a shirt at ₹1,224. He offers a discount of 25% on the marked price. What is the selling price of the shirt?

- A. ₹910
- B. ₹915
- C. ₹900
- D. ₹918

**Q18 Successive Discount**

A retailer marks up the cost price of a laptop by 50% and then offers three successive discounts of 20%, 10%, and 5% during a festive sale. What was the cost price of the laptop if its final selling price was ₹53,352?

- A. ₹52,000
- B. ₹50,000
- C. ₹51,000
- D. ₹52,500

**Q19 Successive Discount**

An article is marked at ₹5,000. A shopkeeper offers three successive discounts on the market price. If the first and second discounts are 15% and 5%, respectively, what is the third discount rate if the customer pays ₹3,230 for the article?

- A. 15%
- B. 10%
- C. 20%
- D. 18%

**Q20 Successive discounts with profit**

A shopkeeper marks the price of a smartphone at ₹6,000. He gives two successive discounts. After the first discount of 20%, he still makes a profit of 25% on the cost price. After the second discount, his profit reduces to 10% on the cost price. What is the percentage of the second discount?

- A. 13%
- B. 12%
- C. 10%
- D. 11%

**Q21 Successive discounts with profit**

A dealer marks an article 50% above its cost price. He then offers two successive discounts of 20% and 15% on the marked price and still makes a profit of ₹255. What is the cost price of the article?

- A. ₹10,500
- B. ₹12,750
- C. ₹13,500
- D. ₹11,250

**Q22 Successive selling profit**

A machine is sold by three sellers in succession. The first seller makes a 20% profit, the second seller makes a 25% profit, and the third seller makes a 30% profit. If the second seller's profit is ₹500 more than the first seller's profit, find the original cost price of the machine.

- A. ₹7,500
- B. ₹5,000
- C. ₹4,000
- D. ₹6,000

**Q23 Successive selling profit**

A manufacturer makes a machine at a production cost of ₹50,000 and sells it to a distributor at a 20% profit. The distributor then resells it to a retailer at a 15% profit. Finally, the retailer sells it to the end customer at a 10% profit. Before selling to the customer, the retailer also incurs an additional transportation and handling cost of ₹2,000. Find the final selling price of the machine.

- A. ₹78,100
- B. ₹76,300
- C. ₹78,200
- D. ₹78,500

**Q24 Working partner salary**

A and B start a cafe with a capital of ₹7,000 and ₹3,000, respectively. After a year, out of the profit of ₹6,700, A gets his share of profit plus some money as his salary. In total, if A gets ₹8,800, what is the salary amount (in ₹) he received?

- A. 4,104
- B. 4,111
- C. 4,115
- D. 4,110



Q25 Working partner salary

A and B start a cafe with a capital of ₹4,400 and ₹4,400, respectively. After a year, out of the profit of ₹3,400, A gets his share of profit plus some money as his salary. In total, if A gets ₹4,700, what is the salary amount (in ₹) he received?

A. 2,999

B. 2,998

C. 3,002

D. 3,000



Arithmetic

18 Questions • Answer Key

Q1 Combining ratios

If $a : b = 2 : 3$ and $b : c = 4 : 5$, then what is the value of $(a + c) : b$?

A. 23 : 12



B. 23 : 11

C. 13 : 12

D. 33 : 12

Q2 Dividing in Ratio

A quadrilateral has sides in the ratio $3 : 4 : 5 : 6$. If its perimeter is 36 units, what is the length of its longest side?

A. 12 units



B. 9 units

C. 6 units

D. 8 units

Q3 Dividing in Ratio

A school allocates a total of 120 books among four classes A, B, C, and D in the ratio $1 : 2 : 3 : 4$. How many books are allotted to class C based on this distribution?

A. 46

B. 36



C. 32

D. 42

Q4 Dividing in Ratio

If the ratio of x to y is $3 : 4$ and the sum of x and y is 56, what is the value of x ?

A. 32

B. 24



C. 18

D. 14

Q5 Dividing in ratio

A sum of money is divided between A and B in the ratio $3 : 2$. If A receives ₹900 more than B, how much money does B receive?

A. ₹1,200

B. ₹900

C. ₹1,800



D. ₹2,700

Q6 Inverse Variation

If x varies inversely as y and $x = 15$ when $y = 24$, find x when $y = 18$.

A. 22

B. 18

C. 20



D. 24

Q7 Percentage to ratio

If 40% of a number is equal to 60% of another number, what is the ratio of the first number to the second?

A. 4:3

B. 2:3

C. 3:4

D. 3:2



Q8 Proportion Find Term

If $x : 18 :: 7 : 9$, then the value of x is ____.

A. 16

B. 18

C. 12

D. 14



Q9 Proportion missing term

A number y is such that $15 : 20 :: y : 24$. What is the value of y ?

A. 20

B. 24

C. 18



D. 16



Q10 Ratio Find Value

The ratio of A's salary to B's salary is 5 : 8. If A's salary is ₹35,000, what is B's salary?

- A. ₹58,000
- B. ₹52,000
- C. ₹56,000
- D. ₹54,000

**Q11 Ratio change**

Two numbers are in the ratio 4 : 9. If the smaller number is increased by 8, the new ratio becomes 2 : 3. What is the original smaller number?

- A. 20
- B. 16
- C. 12
- D. 24

**Q12 Ratio comparison**

Which of the following ratios is the greatest?

- A. 26 : 69
- B. 33 : 85
- C. 42 : 53
- D. 32 : 76

**Q13 Ratio from Percentage**

In a workforce survey, 40% of the employees are engineers and the rest are designers and analysts in the ratio 3 : 2. What is the ratio of engineers to analysts in the company?

- A. 5 : 3
- B. 3 : 2
- C. 5 : 6
- D. 2 : 3

**Q14 Ratio with Percent Change**

Three numbers are in the ratio 2:5:7. After increasing the first number by 50%, decreasing the second by 20%, and increasing the third by 10%, the sum of the resulting numbers is 396.9. What is the original second number?

- A. 135
- B. 150
- C. 125
- D. 108

**Q15 Ratio with Percent Change**

The incomes of P, Q, and R are in the ratio 3:5:7. Their incomes are increased by 10%, 20%, and 30%, respectively. After the increase, the difference between the new incomes of R and P is ₹5,80,000. What is the original income of Q?

- A. ₹4,50,000
- B. ₹6,00,000
- C. ₹5,00,000
- D. ₹4,00,000

**Q16 Variation (proportion)**

A project takes 36 days to complete with a certain number of workers and machines. The time required is directly proportional to the amount of work, inversely proportional to the number of workers, and inversely proportional to the square of the number of machines. If the number of workers is doubled and the number of machines is tripled, while the amount of work remains the same, how many days will the project take to complete?

- A. 6
- B. 8
- C. 2
- D. 4

**Q17 Variation (proportion)**

A car travels at a speed that varies directly with the square root of the fuel efficiency (km/litre). If the speed is 60 km/h when the efficiency is 16 km/litre, what will be the speed when the efficiency increases to 25 km/litre?

- A. 75
- B. 65
- C. 90
- D. 80

**Q18 Variation Percent Change**

A car travels a fixed distance. If its speed varies directly with the cube root of the engine power, by what percentage does the travel time decrease if the engine power increases from 64 kW to 216 kW? [Give your answer correct to two places after decimal.]

- A. 35.33%
- B. 23.33%
- C. 38.33%
- D. 33.33%



Arithmetic

17 Questions • Answer Key

Q1 Average speed

The odometer of a car reads 12050 km at the start of a trip and 12770 km at its end. If the trip took 4 hours, then the average speed of car in m/sec is:

- A. 55
- B. 58
- C. 50
- D. 45



Q2 Average speed

The odometer of a car reads 12060 km at the start of a trip and 12600 km at its end. If the trip took 5 hours, then the average speed of car (in m/sec) is:

- A. 38
- B. 35
- C. 30
- D. 25



Q3 Boat Round Trip

A boat travels 56 km downstream and then returns 56 km upstream to its starting point. The speed of the boat in still water is 12 km/h. During the downstream journey, the stream speed is 4 km/h for the first 28 km and 2 km/h for the remaining 28 km. During the return journey, the stream speed is 2 km/h for the first 28 km and 4 km/h for the remaining 28 km. What is the total time (in hours) taken for the round trip? (Round off your answer to the nearest integer)

- A. 10
- B. 11
- C. 9
- D. 8



Q4 Boat Round Trip

A boat travels between points A and B. The speed of the boat in still water remains constant. The total time taken for the round trip is 9 hours. If the speed of the stream increases by 50%, the round-trip time increases by 1 hour 40 minutes. Find the ratio of the boat's speed in still water to the original speed of the stream.

- A. 4 : 1
- B. 3 : 1
- C. 5 : 2
- D. 2 : 1



Q5 Downstream time

The speed of a boat in still water is 18 km/h and the speed of the stream is 4 km/h. How much time will the boat take to travel 154 km downstream?

- A. 6 hours
- B. 7.5 hours
- C. 6.5 hours
- D. 7 hours



Q6 Downstream-upstream distance

A boat travels downstream in a river from point A to point B and takes 4 hours. The same boat returns upstream from B to A and takes 6 hours. The speed of the stream is 2 km/h. What is the distance between A and B?

- A. 44 km
- B. 42 km
- C. 48 km
- D. 58 km



Q7 Head start race

In a 1000 m race, skater A skates at a speed of 10 m/s, while skater B skates at 12.5 m/s. However, A is given a head start of 150 m over B and also starts 4 seconds earlier. Who wins the race and by how much time?

- A. B wins by 1 second
- B. A wins by 1 second
- C. A wins by 2 seconds
- D. B wins by 2 seconds



Q8 Head start race

A can run at 10 m/s and B at 8 m/s. In a 300 m race, how much head start should B be given so that both finish together?

- A. 50 m
- B. 70 m
- C. 60 m
- D. 80 m



Q9 Race Head Start

Two cars, S and T, are racing over a distance of 400 m. Car S travels at 16 m/s, while car T travels at 12 m/s. How many meters ahead of the starting line must T begin so that both cars reach the finish line at the same time?

A. 120 m

B. 100 m

C. 90 m

D. 80 m

Q10 Race Head Start

In a 2000 m race, Runner C starts 260 m ahead of Runner A and also starts 50 seconds earlier. In a 1000 m race, Runner A beats Runner B by 200 m or 25 seconds. Runner B gives Runner C a head start of 100 m in a 1000 m race and still beats C by 25 seconds. By how many meters will Runner A beat Runner C in the 2000 m race?

A. 250 meters

B. 180 meters

C. 150 meters

D. 240 meters

Q11 Speed Unit Conversion

The odometer of a car reads 12,050 km at the start of a trip and 12,860 km at its end. If the trip took 5 hours, then the average speed of the car in m/sec is:

A. 45

B. 50

C. 40

D. 53

Q12 Speed Unit Conversion

The odometer of a car reads 12050 km at the start of a trip and 12590 km at its end. If the trip took 6 hours, then the average speed of car in m/sec is:

A. 33

B. 25

C. 20

D. 30

Q13 Speed-time-distance basic

A cyclist moves at a constant speed of 5 m/s for 4 hours. How far does the cyclist travel?

A. 72 km

B. 45 km

C. 90 km

D. 60 km

Q14 Speed-time-distance basic

A cyclist covers 90 km in 3 hours. If he maintains the same speed, how long will he take to cover 150 km?

A. 6 hours

B. 8 hours

C. 4 hours

D. 5 hours

Q15 Time from Speed

A postal drone leaves Depot X at 7:45 AM, flying at a constant 36 kilometers per hour. At what time will the drone have covered exactly 54 kilometers from Depot X?

A. 9:30 AM

B. 9:00 AM

C. 8:45 AM

D. 9:15 AM

Q16 Two Trains Crossing

Two trains of lengths 180 m and 140 m are going in the same direction. The faster train takes 80 seconds to cross the slower train completely. If they are moving in opposite directions, they cross each other completely in 8 seconds. What is the speed of the slower train (in km/hr)?

A. 80

B. 64.8

C. 40.8

D. 44.4

Q17 Usual Speed Late

If a person travels at 0.8 of his usual speed and arrives 15 minutes late to his office, what is his usual time to reach the office?

A. 30 minutes

B. 75 minutes

C. 45 minutes

D. 60 minutes



Arithmetic

4 Questions • Answer Key

Q1 Combined Work Rate

A can do a piece of work in 76 hours; B and C together can do it in 57 hours, while A and C together can do it in 36 hours. How long (in hours) will B alone take to do it?

A. 343

B. 344

C. 342



D. 341

Q2 Combined Work Rate

A can do a piece of work in 78 hours; B and C together can do it in 60 hours, while A and C together can do it in 39 hours. How long (in hours) will B alone take to do it?

A. 260



B. 259

C. 262

D. 261

Q3 Combined work rate

A can do a piece of work in 80 hours; B and C together can do it in 42 hours, while A and C together can do it in 30 hours. How long (in hours) will B alone take to do it?

A. 337

B. 335

C. 338

D. 336

**Q4** Combined work rate

A can do a piece of work in 84 hours; B and C together can do it in 42 hours, while A and C together can do it in 36 hours. How long (in hours) will B alone take to do it?

A. 125

B. 126



C. 127

D. 128



Q1 Income Savings

David's salary is ₹20,000 per month. He spends ₹4,500 on house rent, ₹2,500 on bills and the rest of the amount is his monthly savings. Find his savings (in ₹) in a year, if in the month of his birthday he spent his complete monthly saving for the birthday celebration.

A. 1,43,000



B. 1,17,000

C. 1,30,000

D. 1,56,000

Q2 Income Savings

Manjit earns a salary of ₹20,000 per month. He spends ₹5,500 on house rent and ₹3,000 on bills every month, and saves the remaining amount. Find his total savings (in ₹) in one year, given that in the month of his birthday, he spends his entire monthly savings on the birthday celebration.

A. 1,15,000

B. 1,03,500

C. 1,26,500



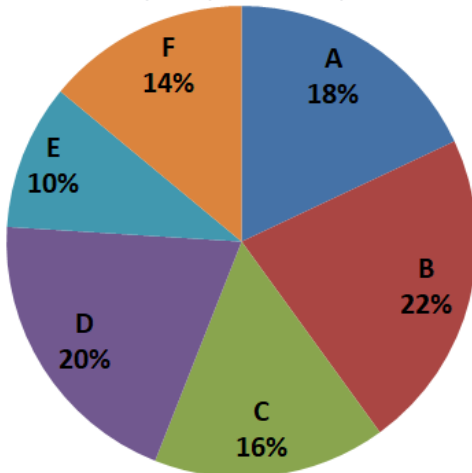
D. 1,38,000



Q1 Bar Graph Average

The following chart shows the total number of students in 6 different colleges.

The percentage of girls in colleges are as follows: A=54%, B=48%, C=60%, D=50%, E=48%, F=55%



If the total number of students in all six colleges is 80000, then the average number of boys (rounded off to the nearest integer) in the colleges A, B, and D is:

A. 7925



B. 7965

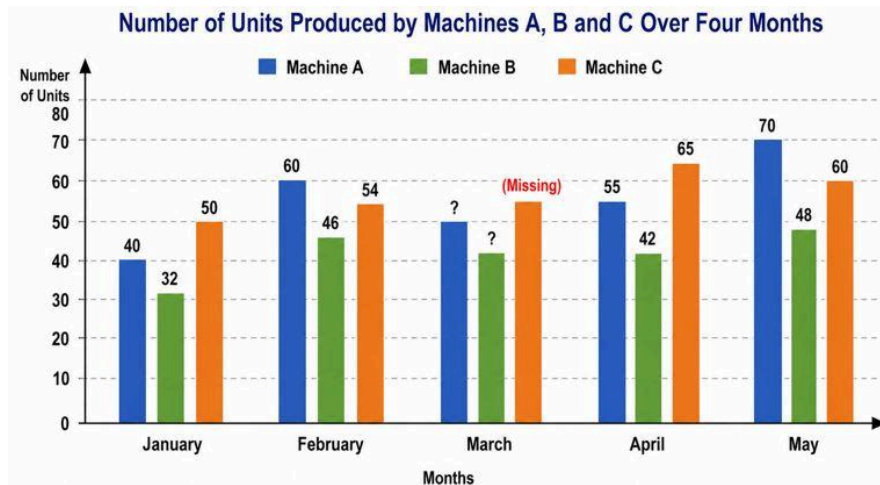
C. 7929

D. 7989



Q2 Bar Graph Missing Value

The multiple bar graph shows the production of Machines A, B, and C over four months.



- In March, Machine B produced 8 fewer units than in February.
- Machine A produced 18 more units than Machine B in March.
- The total production of all three machines in March was 156 units.

Find the production of Machine C in March.

A. 62



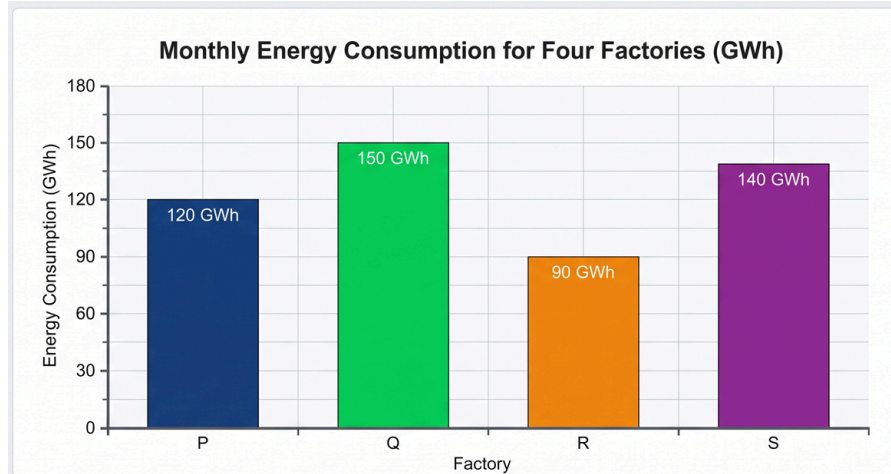
B. 129

C. 58

D. 38

Q3 Bar Graph Percentage

The graph below shows the monthly energy consumption (in GWh) for four factories: P, Q, R, and S.



By what percentage is factory Q's consumption higher than that of factory R (rounded off to the nearest integer)?

A. 33%

B. 67%



C. 75%

D. 50%

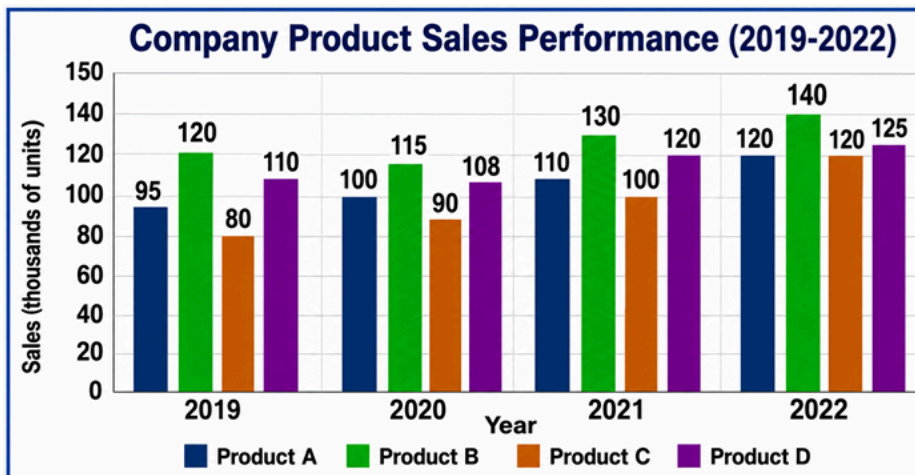


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Q4 Bar Graph Percentage Share

A company manufactures and sells four products (A, B, C, D) from 2019 to 2022. The following bar graph presents the sales (in thousands of units) for each product. In which year did Product C contribute the highest percentage to the total sales of all products, and what was that percentage (rounded to the nearest integer)?

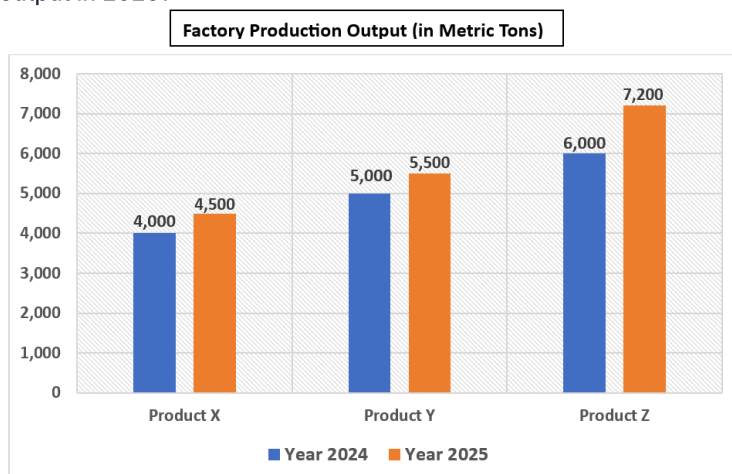


- A. 2021, 21%
- B. 2020, 22%
- C. 2022, 24%
- D. 2021, 22%



Q5 Bar Graph Ratio

The following multiple bar graph tracks the outputs of Products X, Y, and Z. In 2026, the output of Product X grows by 20% over its 2025 level, while Product Z's output falls by 25% from its 2025 level. What is the ratio of Product X's output to Product Z's output in 2026?

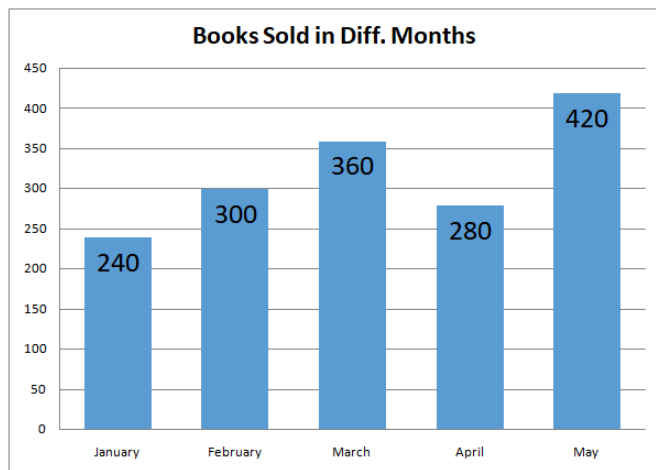


- A. 3 : 4
- B. 5 : 4
- C. 1 : 1
- D. 4 : 5



Q6 Bar graph difference

The bar graph shows the number of books sold by a bookstore during five months.



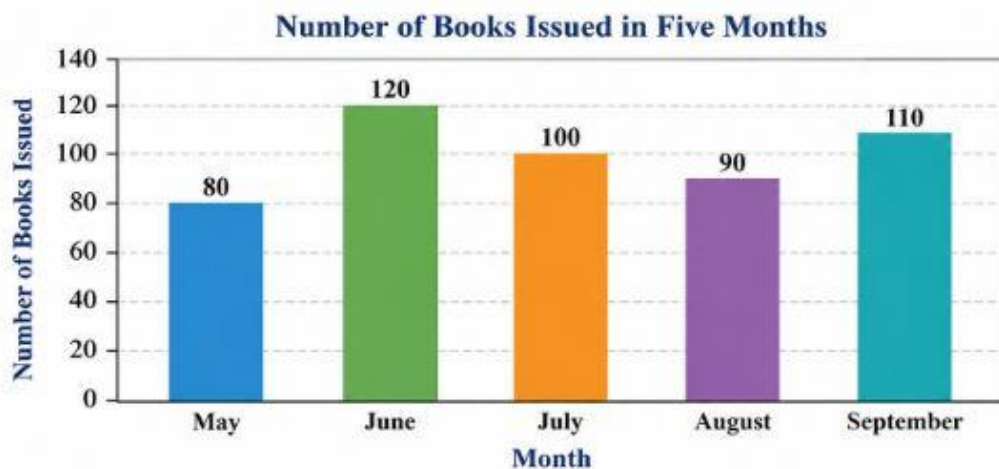
If each book costs ₹250, how much more revenue was generated in **May** than in **February**?

- A. ₹25,000
- B. ₹35,000
- C. ₹40,000
- D. ₹30,000



Q7 Bar graph median

A bar graph displays the number of books issued in five months:



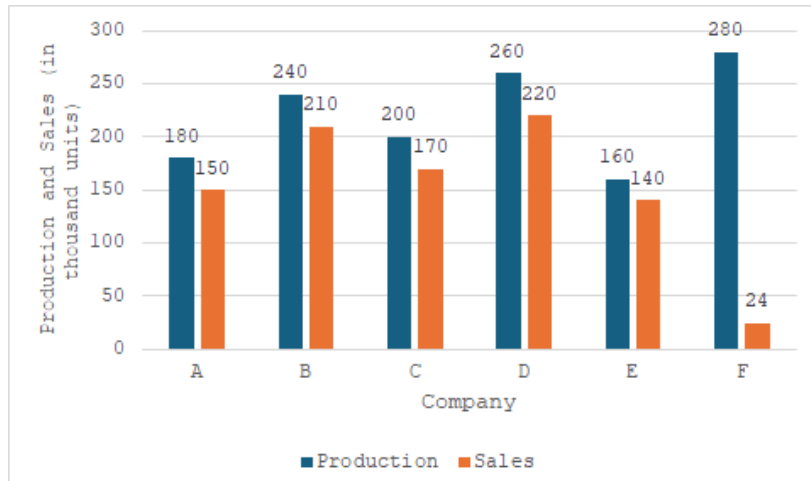
In which month was the number of books issued equal to the median value?

- A. August
- B. September
- C. July
- D. May



Q8 Multiple bar graph

The multiple bar graph given below shows the Production and Sales (in thousand units) of six manufacturing companies (A–F) during the financial year 2025–26.



Additional Information

- The difference between production and sales represents the unsold inventory.
- The cost of production is ₹80 per unit.
- The selling price is ₹120 per unit.
- Unsold inventory is valued at 60% of its production cost.
- Company D received a government subsidy of ₹4 lakh.
- Company E incurred a storage cost of ₹2lakh due to excess inventory.
- Company F paid 12% tax on its gross profit.

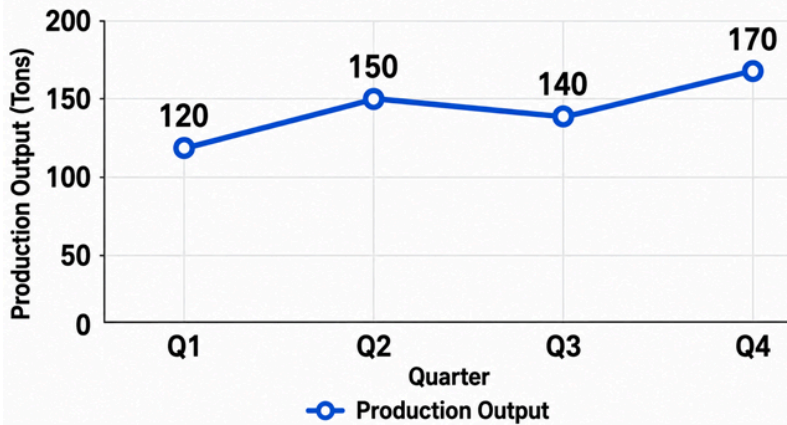
After considering the value of unsold inventory, subsidy, storage cost, and tax, which of the following statements is correct?

- A. Company F earned the highest net gain.
- B. Company B earned a lower net gain than Company F.
- C. Company D's net gain exceeded that of Company B by more than ₹3 lakh. ✓
- D. The combined net gain of Companies A and E was less than that of Company D.



Q1 Line Graph Average

A company's quarterly production output (in tons) for a year is given in the line graph below. What is the average production output (in tons) for the entire year?

Company Quarterly Production Output (Tons)

A. 150

B. 145



C. 140

D. 160

Q2 Line Graph Ratio

A line graph displays the monthly rainfall (in mm) for City Z during the first six months of the year as follows:



What is the ratio of the excess rainfall in the wettest month above the average monthly rainfall to the deficit rainfall in the driest month below the average monthly rainfall?

A. 2:1

B. 1:1



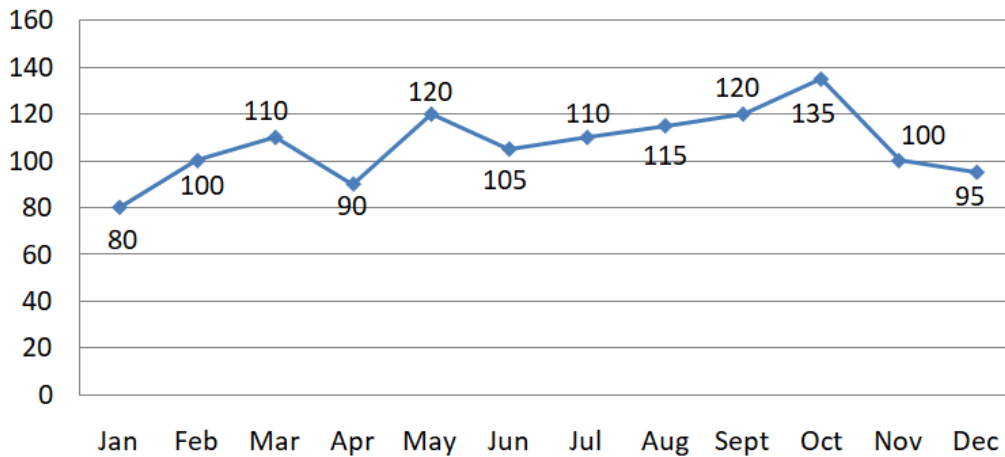
C. 3:2

D. 1:2



Q3 Line graph averages

The following graph represents the month-wise circulation of the number of copies of a monthly magazine (in thousands) for the year 2025.



The average monthly circulation during Jan-May is what percent (nearest integer value) of the average monthly circulation during Jul-Nov?

A. 86%



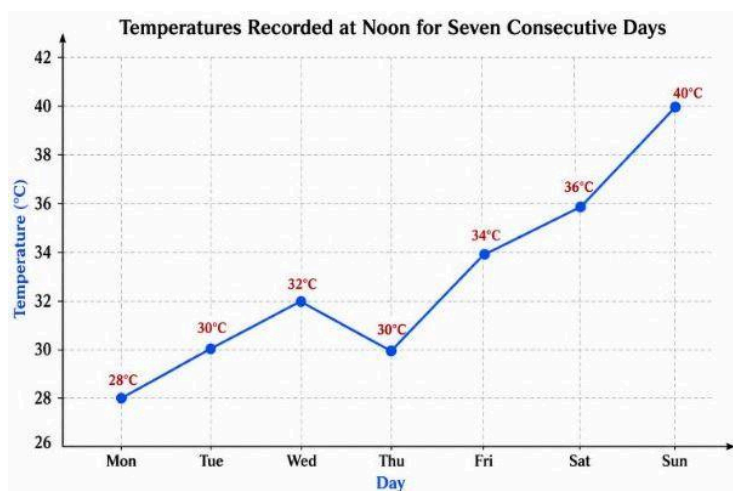
B. 93%

C. 70%

D. 78%

Q4 Line graph change

A line graph shows the temperatures (in °C) recorded at noon for seven consecutive days.



By how many degrees did the temperature increase from Monday to Sunday?

A. 12°C



B. 11°C

C. 13°C

D. 10°C

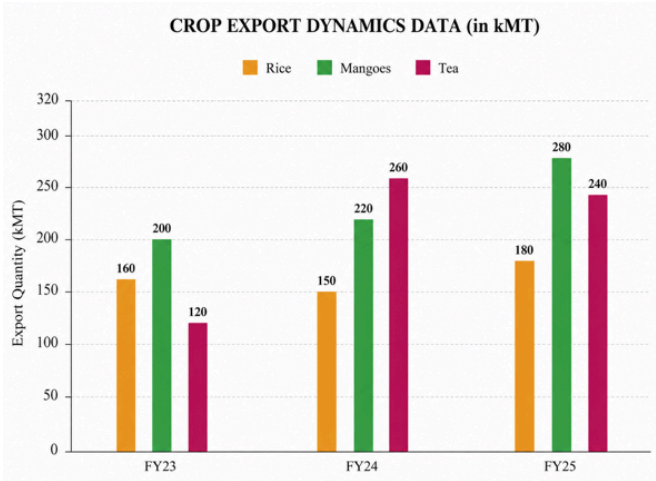


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Q5 Multi-line trend

The graph below shows the export volumes of Rice, Mangoes, and Tea across three fiscal years. Which of the options below best summarizes the performance trend shown in the graph?



- A. Mangoes were the only crop to show a consistent increase in export volume across all three fiscal years.
- B. The total export volume of all three crops combined increased by exactly 100 kMT from FY24 to FY25.
- C. Rice exports experienced a higher percentage growth from FY23 to FY24 than from FY24 to FY25.
- D. The export volume of Tea decreased by 20 kMT from FY24 to FY25, contributing to a total export volume increase of 70 kMT across all categories in the same period.

Q6 Table trend

The table shows the budget distribution of different states in India for education. Study the table and answer the question.
Budget distribution (in ₹ crores)

Year	S1	S2	S3	S4	S5
2020	390	91	207	164	
2015	420	144	234	178	198
2010	498	111	264	180	183
2005	526	129	247	197	180
2000	652	148	280	212	143
					120

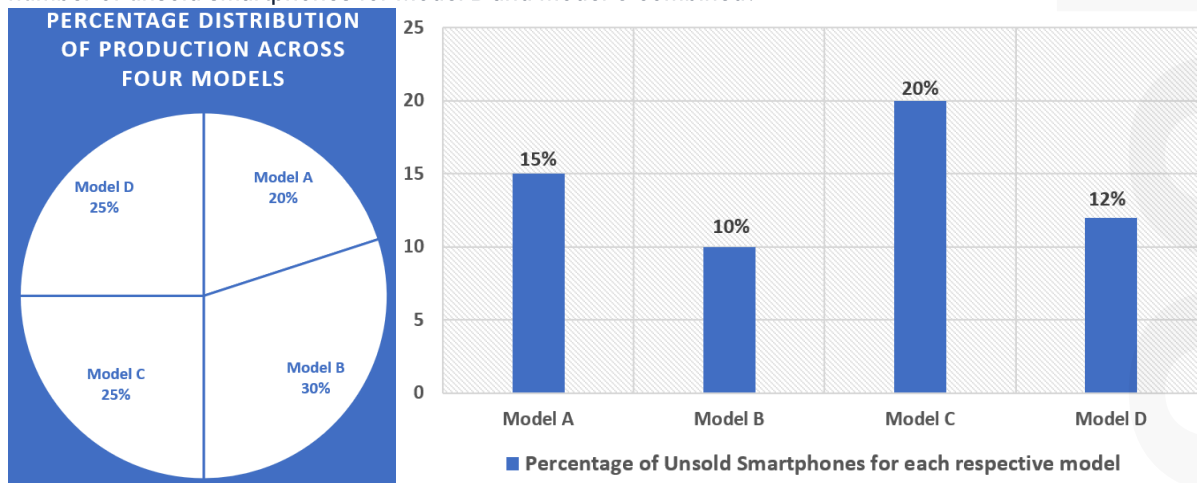
Which states show a continuous increase/decrease in budget distribution over the years?

- A. S1,S2,S5
- B. S2,S3,S4
- C. S1,S4,S5
- D. S3,S4,S5



Q1 Mixed graph DI

The following mixed graph presents data on a company that produced a total of 40,000 smartphones in a year. What is the total number of unsold smartphones for Model B and Model C combined?



A. 2,400

B. 2,800

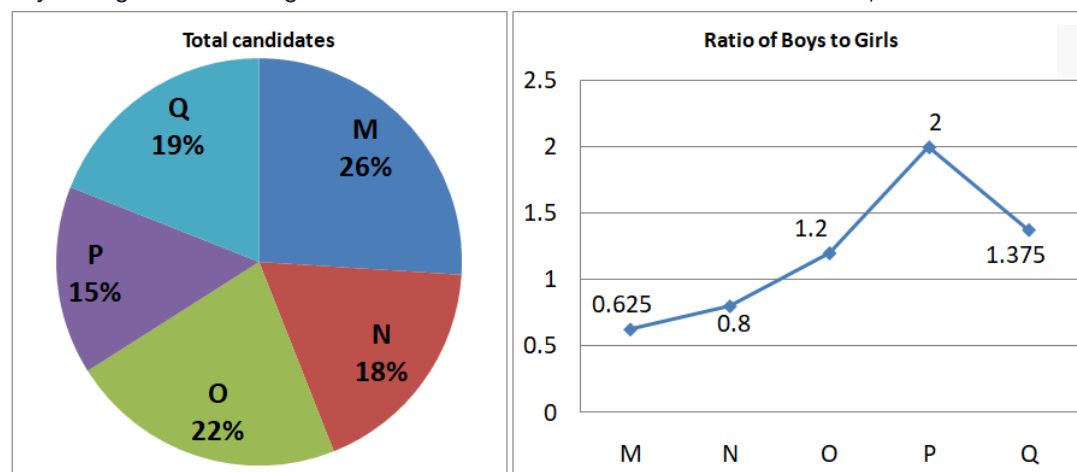
C. 3,000

D. 3,200



Q2 Mixed graph DI

The following chart shows the total number of candidates in 5 different organizations, and the line graph represents the ratio of boys and girls in these organizations. Let the total number of candidates be 60,000.



If 50% of the girl candidates transferred from organization O to organization P, then the total number of boy candidates in M is what percentage of the total number of girl candidates in organization P?

A. 100%

B. 105%

C. 92%

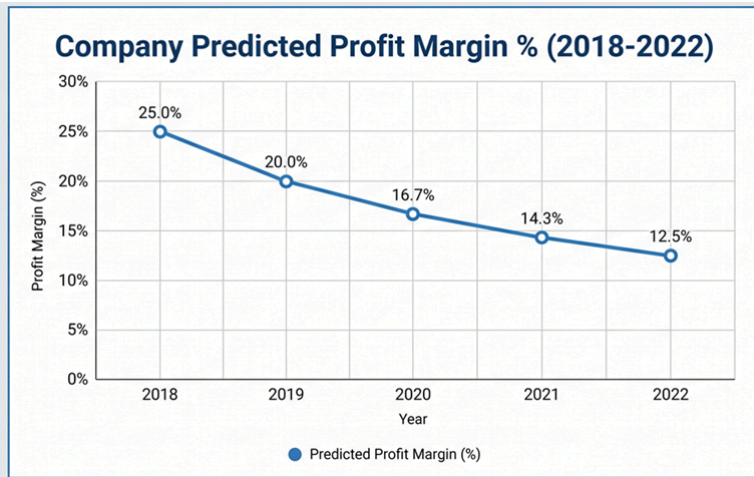
D. 83%



Q3 Table and Line Graph

A company's actual revenue and actual expenditure (in million ₹) from 2018 to 2022 are shown in the table below. The line graph shows the predicted profit margin (in %) for the same years. In which year did the actual profit deviate the most from the profit predicted by the profit margin line graph based on the revenue and expenditure data? (Profit Margin = $\frac{\text{Revenue} - \text{Expenditure}}{\text{Expenditure}}$)

Year	Revenue (million ₹)	Expenditure (million ₹)
2018	120	90
2019	150	110
2020	180	150
2021	210	180
2022	240	210



A. 2019



B. 2018

C. 2021

D. 2020

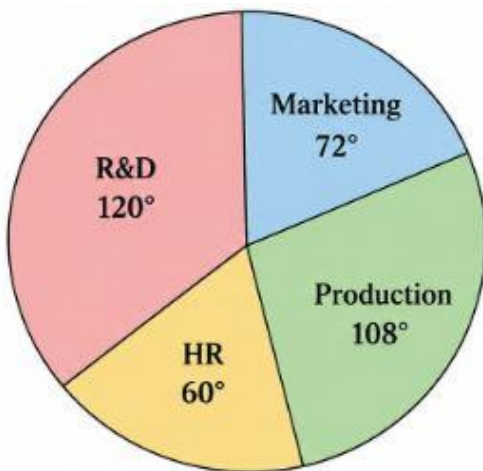


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Q1 Pie Chart Degrees

A company's pie chart shows the distribution of expenses among four departments.



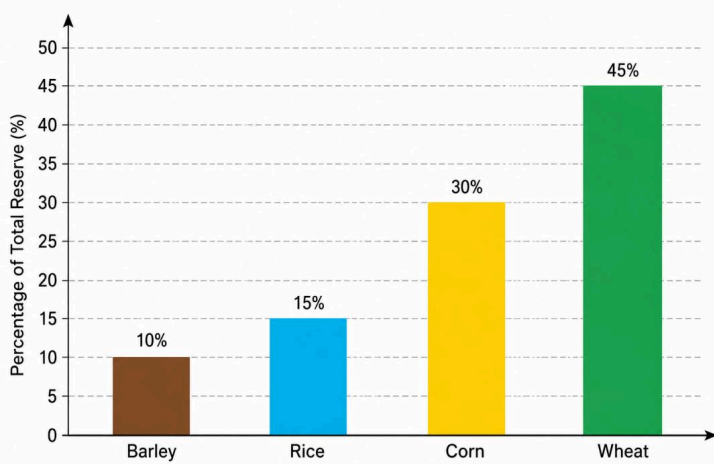
If the company needs to reduce the largest sector by 10% which sector will be affected and what will be its new angle?

- A. Production, 97°
- B. R&D, 108°
- C. HR, 54°
- D. Marketing, 65°



Q2 Pie Chart Ratio

The graph below shows the percentage distribution of four types of ingredients in a mixture. Wheat weighs 315 metric tons. If Barley and Rice are combined into a single "Minor Grains" category, what is the ratio of Minor Grains to Corn?

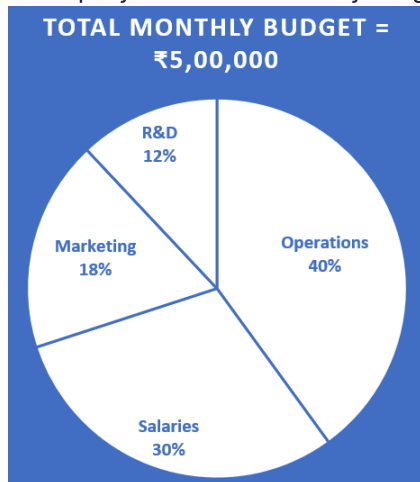


- A. 6:7
- B. 5:7
- C. 7:8
- D. 5:6



Q3 Pie chart value

A company allocates its monthly budget via the following pie chart as shown in the data. What is the expenditure on marketing?



A. ₹95,000

B. ₹1,00,000

C. ₹90,000

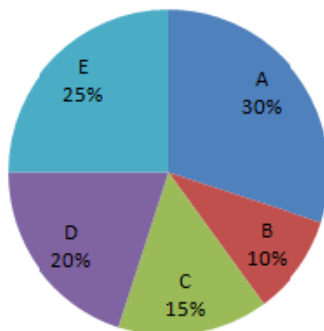


D. ₹80,000

Q4 Pie chart value

The pie chart below shows the export of different fruits from India in a particular year.

Export of different fruits



If a total of 1500 quintals of fruits were exported in the year, find the difference (in quintals) between the exports of B and E.

A. 375

B. 450

C. 150

D. 225



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Data Interpretation

7 Questions • Answer Key

Q1 Table Average

A bank's data for loan approvals in 2022 is given in the table below. If only branches that approved at least 100 home loans and at least 60 education loans are considered, what is the average number of auto loans approved by these branches?

Branch	Home Loans	Auto Loans	Education Loans
Alpha	120	90	60
Beta	140	110	70
Gamma	100	80	40
Delta	130	100	65

A. 95

B. 100



C. 105

D. 110

Q2 Table Formula Ranking

Based on the table and the throughput = $C \times (\sqrt{\epsilon} / \eta) \times (\lambda / 2)$, which sequence correctly shows their descending order from highest to lowest throughput?

Fuel Cell Variant	Active Catalyst Loading (C, in g/m ²)	Matrix Porosity Factor (ϵ)	Parasitic Overpotential Loss (η)	Membrane Hydration Variable (λ)
Type- α	2.4	0.64	0.12	14
Type- β	3.6	0.81	0.08	12
Type- γ	1.8	0.36	0.15	16
Type- δ	3.2	0.49	0.05	10

A. Type- β > Type- α > Type- δ > Type- γ B. Type- β > Type- δ > Type- α > Type- γ C. Type- δ > Type- β > Type- α > Type- γ D. Type- δ > Type- β > Type- γ > Type- α 

Q3 Table Percentage Change

The table below shows the number of books sold by four stores from Monday to Thursday.

Store	Monday	Tuesday	Wednesday	Thursday
A	15	18	20	22
B	12	14	16	18
C	10	13	15	17
D	11	15	18	21

The manager plans to reward the store that recorded the highest percentage increase in book sales from Monday to Thursday. Which store should receive the reward?

A. B

B. C

C. D



D. A

Q4 Table Trend

A company's sales data for four consecutive years is shown in the table below. Based on the data, which product has sales that increased every year, with the increase staying the same over the four years?

Year	Product A	Product B	Product C	Product D
2019	120	85	105	130
2020	135	90	125	120
2021	150	110	118	140
2022	165	115	130	150

A. Product B

B. Product A



C. Product D

D. Product C

Q5 Table average

A table displays the number of cars sold by four dealerships (A, B, C, D) over four quarters.

Dealership	Q1	Q2	Q3	Q4
A	120	135	140	110
B	130	125	120	115
C	140	145	150	135
D	110	120	115	125

Which dealership had the highest average sales per quarter?

A. C



B. B

C. A

D. D



Q6 Table percentage

The following table shows the total number of employees joining five different companies in six different years:

	X	Y	Z	M	N
2020	540	260	180	520	400
2021	620	240	160	560	320
2022	480	280	190	550	100
2023	660	320	220	640	260
2024	700	300	210	540	450
2025	350	740	230	680	500

By what percentage (rounded off to the nearest integer) should the number of employees joining company Y in 2025 be reduced so that the combined employees joining companies Y and Z in 2025 become equal to the combined employees joining companies M and N in 2023?

A. 5%

B. 12%

C. 9%



D. 11%

Q7 Table percentage

Consider the following table showing the cost (in ₹) of raw materials purchased by a company over four months:

Month	Steel (₹)	Copper (₹)	Plastic (₹)
January	8,000	5,000	3,000
February	8,500	5,200	3,300
March	8,200	5,100	3,500
April	8,800	5,400	3,600

If the company aims to reduce its monthly raw material expenditure by 10% in May compared to the highest spending month, what is the maximum amount (in ₹) it should spend in May?

A. ₹16,020



B. ₹17,600

C. ₹15,840

D. ₹16,200



Q1 Chord Length

A chord AB is drawn in a circle with centre O and radius 7 cm. If the shortest distance between centre and chord is 5 cm, then the length of chord AB is:

A. $3\sqrt{6}$ cmB. $5\sqrt{6}$ cmC. $4\sqrt{6}$ cmD. $2\sqrt{6}$ cm**Q2** Chord length

In a circle of radius 10 cm, a chord is drawn perpendicular to the radius. If the distance from the centre to the chord is 6 cm, what is the length of the chord?

A. 12 cm

B. 8 cm

C. 6 cm

D. 16 cm

**Q4** Chord length

In a circle, a chord AB subtends a right angle at the center O of the circle. If the radius of the circle is 7 cm, what is the length of chord AB (in cm)?

A. $9\sqrt{2}$ B. $5\sqrt{2}$ C. $7\sqrt{2}$ D. $3\sqrt{2}$ **Q3** Tangents from External Point

Two tangents are drawn from an external point to a circle. If the angle between the tangents is 60° , what is the angle between the radii joining the center to the points of contact?

A. 120° B. 110° C. 130° D. 100° 

Q1 Area from coordinates

The coordinates of a triangle are $A(1, 2)$, $B(4, 6)$, and $C(k, 10)$. If the area of the triangle is 15 square units, then the possible value(s) of k is (are):

A. - 0.5 and 14.5



B. - 1 and 29

C. 14.5 only

D. - 0.5 only



Geometry

4 Questions • Answer Key

Q1 Alternate Interior Angles

A transversal cuts two parallel lines, forming alternate interior angles of $(3x+18)^\circ$ and $(x+54)^\circ$. Find the value of x .

A. 17

B. 16

C. 19

D. 18

**Q2** Angle between parallel lines

Two parallel lines are cut by a transversal. If one alternate interior angle measures $(5x - 8)^\circ$ and the other measures $(2x + 46)^\circ$, what is the value of x ?

A. 14

B. 12

C. 20

D. 18

**Q3** Angle between parallel lines

There is a point E between two parallel lines AB and CD, such that $\angle ABE = 135^\circ$ and $\angle CDE = 120^\circ$. What is the measure of the reflex angle $\angle BED$?

A. 245° B. 250° C. 275° D. 255° **Q4** Co-interior Angles

If two interior angles on the same side of a transversal intersecting two parallel lines are in the ratio 4:5, then what is the smaller angle?

A. 72° B. 80° C. 54° D. 60° 

Q1 Rectangle diagonal

The perimeter of a rectangular plot is 82 m, and the area is 420 sq. m. What is the length (in m) of its diagonal?

A. 25

B. 34

C. 29



D. 41

Q2 Rhombus with incircle

A circle of radius 6 cm is inscribed in a rhombus with one diagonal of length 20 cm. What is the perimeter of the rhombus?

A. 50 cm



B. 44 cm

C. 48 cm

D. 52 cm



Q1 Centroid area division

In triangle XYZ, the medians from X and Y intersect at point G. If the area of triangle XYZ is 54 square units, what is the area (in square units) of triangle XGY?

A. 36

B. 18



C. 12

D. 9

Q2 Similar Triangle Area

In triangle ABC, $AB = 13$ cm, $BC = 14$ cm, and $CA = 15$ cm. A line parallel to BC cuts AB and AC so that the area of the smaller triangle formed is one-fourth that of triangle ABC. What is the length of the segment parallel to BC?

A. 7 cm



B. 8 cm

C. 9 cm

D. 6 cm



Mensuration

12 Questions • Answer Key

Q1 Cubes in Cuboid

A cold storage unit is built in the shape of a cuboid with internal dimensions of $12\text{ m} \times 8\text{ m} \times 5\text{ m}$. The unit is initially empty. Later, identical cubical ice blocks of side 2 m are stored inside it. What is the maximum number of such ice blocks that can be completely accommodated in the storage unit?

A. 48



B. 54

C. 64

D. 46

Q2 Cuboid Volume

The volume of a cuboid is 216 cm^3 , and its base area is 36 cm^2 . What is its height?

A. 18 cm

B. 6 cm



C. 12 cm

D. 36 cm

Q3 Cuboid volume

A water tank shaped like a cuboid measures 10 m in length, 2 m in width, and 1.5 m in height. What is the maximum volume of water it can hold?

A. 13 m^3 B. 30 m^3 C. 15 m^3 D. 20 m^3

Q4 Cuboid walls and volume

A storage box has a length that is twice its width and a height of 4 meters . If the total area of its four walls is 96 square meters , what is the volume of the box?

A. 128 m^3 B. 192 m^3 C. 144 m^3 D. 160 m^3

Q5 Hemisphere Surface Area

A hemispherical water tank has a diameter of 12 m . If only its curved surface is painted, what is the area (in m^2) of the surface that is painted?

A. 72π B. 108π C. 144π D. 36π

Q6 Hemisphere surface area

If the total surface area of a hemisphere is $972\pi\text{ sq. cm}$, then the diameter (in cm) of the base of the hemisphere is:

A. 12

B. 48

C. 24

D. 36



Q7 Hemispherical shell

A hemispherical shell has an external radius R and an internal radius r . If the total surface area of the shell is $448\pi\text{ cm}^2$ and $R - r = 8\text{ cm}$, what is the value of $R + r$?

A. 14 cm

B. 12 cm

C. 16 cm



D. 20 cm

Q8 Melting and Recasting

A solid cuboid of dimensions $54\text{ cm} \times 33\text{ cm} \times 12\text{ cm}$ is melted and cast into several identical solid cylinders, each of radius 6 cm and height 9 cm . How many full cylinders can be formed? (Use $\pi = 22/7$)

A. 21



B. 18

C. 24

D. 19



Q9 Melting and Recasting

A factory melts a solid metal cuboid block of dimensions 12 cm × 10 cm × 8 cm and recasts it into identical cylindrical rods, each having a radius of 1 cm and a height of 4 cm. During the process of melting and casting, 10% of the metal is lost due to wastage. How many complete cylindrical rods can be produced from the remaining metal? [Use $\pi = 3.14$]

A. 62

B. 68

C. 70

D. 64

Q10 Melting and recasting

The diameter of an iron ball is 15 cm. It is melted and made in to a solid cylinder of height 2.5 cm, find the diameter of the base of the cylinder.

A. 30 cm

B. 4 cm

C. 15 cm

D. 8 cm

Q11 Hemisphere Surface Area

A solid wooden block is shaped like a perfect hemisphere with a radius of 21 cm. The entire outer surface, including the flat circular base, must be painted. If the rate of painting is ₹250 per 100 square centimeters, what is the total cost of painting the block? (Use $\pi = \frac{22}{7}$)

A. ₹10,395

B. ₹11,245

C. ₹9,355

D. ₹8,425

Q12 Melting and recasting

A solid iron cube of side 14 cm is melted and recast into a cylindrical rod of radius 3.5 cm. Find the length (height) of the cylindrical rod. (Use $\pi = \frac{22}{7}$)

A. $\frac{24}{7}$ cm

B. 54 cm

C. 68 cm

D. $\frac{784}{11}$ cm



Mensuration

6 Questions • Answer Key

Q1 Incircle-circumcircle ring

An equilateral triangle has a side length of $14\sqrt{3}$ cm. A large circle (circumcircle) passes through its three corners, and a smaller circle (incircle) touches all three sides from inside. What is the area of the ring-shaped region between these two circles? (Use $\pi = 22/7$)

- A. 427 cm^2
- B. 483 cm^2
- C. 462 cm^2 ✓
- D. 492 cm^2

Q2 Inner Path Fencing

A rectangular park has dimensions of 50 m by 30 m. A uniform path of width 5 m is constructed inside the park along all four sides. If the cost of fencing the perimeter of the remaining inner rectangular region is ₹50 per metre, find the total cost of fencing.

- A. ₹5,000
- B. ₹6,000 ✓
- C. ₹4,000
- D. ₹7,000

Q5 Shaded region area

A square courtyard has a side length of 24 m. At each corner of the courtyard, a quarter-circle of radius 8 m is constructed inside the square. A circular fountain of radius 4 m is placed exactly at the centre of the courtyard. The fountain does not overlap with any quarter-circle. The remaining portion of the courtyard is paved with decorative tiles and is considered the shaded region. The area (in m^2) of the shaded region is:

- A. $576 - 72\pi$
- B. $576 - 78\pi$
- C. $576 - 80\pi$ ✓
- D. $576 - 84\pi$

Q6 Square Minus Circle

A circle of radius 7 cm is inscribed in a square. What is the area (in cm^2) of the region inside the square but outside the circle? (Take $\pi = \frac{22}{7}$)

- A. 77
- B. 63
- C. 42 ✓
- D. 56

Q3 Isosceles Triangle Area

A field is in the form of an isosceles triangle whose equal sides are 37 m each and the third side is 24 m. What is its area (in m^2)?

- A. 400
- B. 440
- C. 420 ✓
- D. 460

Q4 Square Minus Circle

A circle of radius 7 cm is inscribed in a square. What is the area (in cm^2) of the shaded region outside the circle but inside the square? (Use $\pi = 22/7$)

- A. 28
- B. 14
- C. 42 ✓
- D. 56



Number System

13 Questions • Answer Key

Q1 Divisibility Missing Digit

What is the smallest value of x that makes $43x2$ divisible by 6?

- A. 1
- B. 3
- C. 2
- D. 0

**Q2** Divisibility by 2 and 3

Which of the following numbers is divisible by both 2 and 3?

- A. 246
- B. 244
- C. 243
- D. 245

**Q3** Divisibility by 6 and 9

A digital lock system only accepts codes divisible by both 6 and 9. Which of these codes would be accepted?

- A. 135
- B. 152
- C. 138
- D. 162

**Q4** Finding LCM

The LCM of the numbers 6, 108 and 81 is:

- A. 108
- B. 216
- C. 324
- D. 432

**Q5** Finding LCM

The LCM of the numbers 14, 91 and 162 is:

- A. 14742
- B. 13984
- C. 14472
- D. 15642

**Q6** HCF LCM Relation

The LCM of two numbers is 24 times their HCF. The sum of the HCF and LCM is 775. If one of the numbers is 93, then the other number is:

- A. 155
- B. 372
- C. 144
- D. 248

**Q7** HCF-LCM of numbers

Let HCF of $x = 450$, $y = 360$ and $z = 80k$ be 30. Find the LCM of x , y and z when k is the least natural number.

- A. 4,500
- B. 2,160
- C. 8,400
- D. 3,600

**Q8** LCM Bells

Three bells ring at intervals of 8, 12, and 15 minutes, respectively. If they all ring together at 7:00 a.m., when will they next ring together?

- A. 7:30 a.m.
- B. 8:20 a.m.
- C. 8:15 a.m.
- D. 9:00 a.m.

**Q9** LCM of numbers

The LCM of the numbers 13, 91 and 143 is:

- A. 1331
- B. 1231
- C. 1001
- D. 1189

**Q10** LCM of numbers

The LCM of the numbers 9, 45 and 75 is:

- A. 325
- B. 450
- C. 225
- D. 125



Q11 LCM with Remainder

What is the smallest natural number which, when divided by 6, 8, and 10, leaves a remainder of 3 in each case?

- A. 243
- B. 131
- C. 123
- D. 117

**Q12 Prime Divisibility**

Let p and q be two distinct prime numbers greater than 3. A number N is defined as $N = p^2q + pq^2$. Which of the following statements is always true?

- A. N is coprime with both p and q
- B. N is exactly divisible by the product of p and q
- C. N is a prime number
- D. N is divisible by $p - q$

**Q13 HCF-LCM product relation**

The LCM and the HCF of two numbers are 6615 and 21, respectively. If sum of the two numbers is 1428, then find the sum of the reciprocals of the two numbers.

- A. $\frac{66}{6615}$
- B. $\frac{1427}{6615}$
- C. $\frac{73}{6615}$
- D. $\frac{68}{6615}$



Number System

8 Questions • Answer Key

Q1 AP Sum

In an arithmetic progression, the sum of the first 20 terms is 640 and the sum of the first 10 terms is 220. What is the 15th term of this sequence?

A. 40

B. 47

C. 41



D. 45

Q2 AP Sum

A university research project requires the sum of the first n terms of an arithmetic progression (AP), where the first term is 5, and the common difference is 3. If the sum equals 185, which value of n satisfies this scenario?

A. 8

B. 15

C. 10



D. 12

Q3 AP nth Term

A manufacturing conveyor delivers boxes, where the number of items in each box forms an arithmetic progression: the first box contains 13 items and each subsequent box has 7 more items than the previous one. How many items are in the fifth box delivered?

A. 19

B. 34

C. 48

D. 41



Q4 AP nth Term

Which of the following is the 8th term of an arithmetic progression with first term 7 and common difference -2?

A. -7



B. 5

C. 1

D. 3

Q5 AP nth term

If an arithmetic progression has a first term of -3.6 and a common difference of 7, what is the 9th term?

A. 43.4

B. 52.4



C. 58.4

D. 48.4

Q6 AP nth term

In an arithmetic progression, the 7th term is chosen for a temperature control process involving sequential sensor readings. If the first reading is 18 degrees and each subsequent reading increases by 2.5 degrees, what is the value of the 7th sensor reading?

A. 35.5 degrees

B. 40.5 degrees

C. 31 degrees

D. 33 degrees



Q7 AP sum of terms

If the sum of the first n terms of an AP is given by $S_n = 2n^2 + 7n$, find the 25th term of the AP.

A. 105



B. 114

C. 96

D. 87



Q8 AP sum of terms

If the first term of an arithmetic progression is 12, and the sum of the first 12 terms is equal to one-fourth of the sum of the next 12 terms, find the sum of first 36 terms.

A. **−4608**



B. −4314

C. −5024

D. −4816



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Number System

13 Questions • Answer Key

Q1 Consecutive Odd Squares

What is the sum of the squares of three consecutive odd natural numbers whose sum is 201?

- A. 13,115
- B. 13,295
- C. 13,475
- D. 13,655



Q2 Consecutive Odd Squares

The sum of the squares of two consecutive odd natural numbers is 802. The sum of the numbers is:

- A. 42
- B. 40
- C. 44
- D. 24



Q3 Coprime count

How many positive integers less than 100 are coprime with 90?

- A. 26
- B. 45
- C. 27
- D. 18



Q4 Perfect square multiplier

The smallest number that should be multiplied by 75 to make it a perfect square is:

- A. 15
- B. 3
- C. 5
- D. 2



Q5 Prime Divisibility

If p is a prime number greater than 3, which of the following is always true regarding $p^2 - 1$?

- A. It is always divisible by 10.
- B. It is always divisible by 15.
- C. It is always a prime number.
- D. It is always divisible by 24.



Q6 Sum of Cubes

What is the absolute difference between m and n if the sum of cubes of the first m natural numbers is 14,400 and that of the first n natural numbers is 44,100?

- A. 6
- B. 5
- C. 4
- D. 10



Q7 Sum of Cubes

Find the sum of the cubes of natural numbers from 15 to 24.

- A. 90,000
- B. 75,600
- C. 78,975
- D. 86,625



Q8 Sum of Natural Numbers

If the sum of the first n natural numbers is 465 and the sum of the first $(n-5)$ natural numbers is 325, what is the value of n ?

- A. 40
- B. 10
- C. 20
- D. 30



Q9 Sum of cubes

Which of the following is the smallest integer n such that the sum of the cubes of the first n natural numbers exceeds 10,000?

- A. 15
- B. 13
- C. 16
- D. 14



Q10 Sum of cubes

What is the average of the cubes of the first six natural numbers?

- A. 86.5
- B. 76.5
- C. 83.5
- D. 73.5

**Q11** Sum of cubes

The sum of the cubes of the first n natural numbers is 3025. What is the value of n ?

- A. 8
- B. 11
- C. 9
- D. 10

**Q12** Sum of natural numbers

If the sum of natural numbers from 1 to m is 990, which value does m represent?

- A. 44
- B. 40
- C. 50
- D. 45

**Q13** Sum of odd numbers

Find the sum of all natural numbers that are less than 20 and coprime to 2.

- A. 110
- B. 120
- C. 92
- D. 100



Statistics

10 Questions • Answer Key

Q1 Arithmetic mean

A researcher collects data on the number of books read by a group of people in a year: 10, 15, 12, 18, 20, 17, 13, 19, 16, 25. Find the arithmetic mean of the number of books read.

A. 16.5



B. 16

C. 17.5

D. 17

Q2 Assumed Mean Deviation

A data set has values: 100, 110, 120, 130, 140. If you choose 120 as the assumed mean, what is the sum of deviations from the assumed mean?

A. -20

B. 20

C. 0



D. 10

Q3 Assumed Mean Sufficiency

A researcher calculates the arithmetic mean of a grouped dataset using an assumed mean (A) of 50. Which combination of statements is sufficient to find the actual arithmetic mean?

Statement I: The sum of the frequencies (Σf) is exactly 100.
Statement II: The sum of the products of frequencies and deviations (Σfd) is +250.

Statement III: The lowest class interval starts at 10.

A. Statements I and II together are not sufficient

B. All statements I, II, and III together are necessary

C. Statements I and III together are sufficient

D. Statements I and II together are sufficient



Q4 Grouped data mean

A frequency distribution is given below:

Value (x)	Frequency (f)
10	2
20	4
30	3
40	1

What is the arithmetic mean?

A. 21

B. 25

C. 18

D. 23



Q5 Mean of Grouped Data

As part of their environmental awareness program, a group of students conducted a survey and gathered the following data on the number of plants in 12 houses within a locality. What is the mean number of plants per house? (Rounded off to the nearest integer.)

Number of Plants	Number of Houses
0 – 2	1
2 – 4	2
4 – 6	2
6 – 8	3
8 – 10	4

A. 4

B. 3

C. 5

D. 6



Q6 Median of Data

Find the median of the values of 13, 9, 18, 11, 8, 6, 15, 7, 2, 5.

A. 8

B. 8.5



C. 9

D. 17



Q7 Median of Data

The marks obtained by 9 students in a class are:
42, 38, 45, 40, 35, 50, 48, 37, 44.
What is the median of the marks?

A. 42



B. 44

C. 40

D. 43

Q8 Median of data

What is the median of 15, 22, 18, 26, 20, 24?

A. 23

B. 21



C. 20

D. 22

Q9 Median of data

Find the median of 3, 5, 7, 9, 11, 13, 15.

A. 10

B. 8

C. 11

D. 9

**Q10 Grouped data mean**

Find the arithmetic mean of the given data.

Class Interval	0-8	8-16	16-24	24-32	32-40
Frequency	4	3	2	5	2

A. 24

B. 18

C. 19



D. 27



Statistics

4 Questions • Answer Key

Q1 Range Change

In a class, the marks of five students are: 72, 85, 68, 90, and 77. If the highest mark increases to 95, how does the range change?

A. Increases by 5



B. No change

C. Decreases by 5

D. Increases by 3

Q2 Range Comparison

Which of the following data sets has the greatest range?

Data Set A: 12, 15, 18, 25;

Data Set B: 9, 16, 22, 24;

Data Set C: 5, 10, 15, 19;

Data Set D: 8, 12, 16, 20

A. Data Set C

B. Data Set B



C. Data Set D

D. Data Set A

Q3 Range after change

A dataset of daily high temperatures for a week (in degrees Celsius) is: 21, 24, 18, 22, 27, 19, 25. If the temperature of 27 is replaced by 30, what is the new range (in degrees Celsius)?

A. 12



B. 9

C. 8

D. 10

Q4 Range after change

The ages of six students in a class range from 12 years for the youngest to 18 years for the oldest. Each student's age is first increased by 10%. After this adjustment, the youngest student is replaced with a student having an age that is 2 years less than his increased age, while the oldest student is replaced with a student having an age that is 1 year more than his increased age. What is the resulting range of the students' ages (in years)?

A. 7.6

B. 9.6



C. 6.6

D. 8.5



Statistics

8 Questions • Answer Key

Q1 Probability

Three coins are tossed. What is the probability that at least one coin shows tails?

A. 0.875



B. 0.5

C. 0.75

D. 0.625

Q2 Probability

If two fair coins are tossed, what is the probability of getting at least one tail?

A. 0.75



B. 0.50

C. 0.80

D. 0.25

Q3 Probability

What is the probability of drawing a card that is neither black nor a face card?

A. $\frac{5}{13}$ B. $\frac{8}{13}$ C. $\frac{6}{13}$ D. $\frac{12}{13}$

Q4 Probability

A coin is tossed twice. What is the probability of getting atleast one head?

A. $\frac{1}{4}$ B. $\frac{1}{2}$ C. $\frac{1}{3}$ D. $\frac{3}{4}$ 

Q5 Probability

A card is drawn at random from a well-shuffled standard deck of 52 playing cards. If it is known that the card drawn is a face card or a red card, what is the probability that it is a King?

A. $\frac{1}{8}$



B. $\frac{1}{7}$

C. $\frac{1}{5}$

D. $\frac{2}{5}$

Q6 Probability

If a card is drawn at random from a deck, what is the probability that it is neither a diamond nor a queen?

A. $\frac{12}{52}$

B. $\frac{39}{52}$

C. $\frac{40}{52}$

D. $\frac{36}{52}$

**Q7 Probability**

A card is drawn from a deck and not replaced. What is the probability that the first card is a spade and the second card is a diamond?

A. $\frac{1}{15}$

B. $\frac{13}{221}$

C. $\frac{13}{204}$



D. $\frac{1}{16}$

Q8 Probability

Two fair coins are tossed simultaneously. What is the probability of getting exactly one head?

A. $\frac{3}{4}$

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

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

D. $\frac{1}{2}$

