ATMA Quantitative Skills
Sample Paper – 10

Duration: 60 Minutes **Maximum Marks: 60**

Instructions

- This paper contains **60** Multiple Choice Questions (Single Correct Answer) arranged in **two parts (Part I: Q1–Q30, Part II: Q31–Q60)**, modelled on the Quantitative Skills portion of **ATMA** (AIMS Test for Management Admissions).
- Each correct answer carries **+1 marks**. There is **a penalty of** 0.25 **mark** for each incorrect answer, while unattempted questions earn **0**.
- Only **one** option is correct. Choose carefully.
- Syllabus level: **Quantitative aptitude (arithmetic, algebra, geometry, modern maths, data interpretation)**
- Use of mobile phones, calculators, or electronic gadgets is strictly prohibited.

Part I (Q1–Q30)

Q1. The unit digit of 7^{95} is

(A) 1

(B) 3

(C) 7

(D) 9

Q2. The least number which when divided by 12, 15 and 20 leaves a remainder 5 in each case is

(A) 55

(B) 60

(C) 65

(D) 70

Q3. The population of a town increases by 10% in the first year and by 20% in the second year. If the present population is $13{,}200$, the population two years ago was

(A) $10{,}000$

(B) $11{,}000$

(C) $9{,}000$

(D) $12{,}000$

Q4. If A's income is 25% more than B's income, then B's income is less than A's income by

(A) 25%

(B) 30%

(C) 24%

(D) 20%

Q5. Two numbers are in the ratio $5 : 7$. If 6 is subtracted from each, the new ratio becomes $2 : 3$. The larger number is

(A) 35

(B) 42

(C) 30

(D) 49

Q6. The average weight of 8 persons increases by 2.5 kg when a new person replaces one weighing 56 kg. The weight (in kg) of the new person is

(A) 76

(B) 68

(C) 72

(D) 80

Q7. A man sells two articles for $\text{Rs. } 1980$ each. On one he gains 10% and on the other he loses 10%. His overall result on the whole transaction is

(A) gain of 1%

(B) no profit no loss

(C) loss of 1%

(D) loss of 2%

Q8. An article costing $\text{Rs. } 600$ is marked up so that after allowing a discount of 20% the seller still earns a profit of 20%. The marked price (in Rupees) is

(A) 840

(B) 720

(C) 960

(D) 900

Q9. A sum of money doubles itself in 8 years at simple interest. The number of years in which it will become five times itself at the same rate is

(A) 40

(B) 32

(C) 24

(D) 36

Q10. A boat travels 30 km downstream in 3 hours and the same distance upstream in 5 hours. The speed of the stream (in km/h) is

(A) 2

(B) 3

(C) 4

(D) 1

Q11. Two trains of lengths 120 m and 180 m run on parallel tracks in opposite directions at 54 km/h and 36 km/h respectively. The time (in seconds) they take to cross each other completely is

(A) 15

(B) 10

(C) 12

(D) 18

Q12. A can do a piece of work in 10 days and B in 15 days. They work together for 4 days, after which A leaves. The number of days B takes to finish the remaining work is

(A) 4

(B) 6

(C) 7

(D) 5

Q13. Pipe A fills a tank in 6 hours and pipe B empties it in 9 hours. If both pipes are opened together when the tank is empty, the time (in hours) to fill the tank is

(A) 18

(B) 15

(C) 12

(D) 20

Q14. The cost of 3 pens and 5 pencils is $\text{Rs.}\,57$, and the cost of 5 pens and 3 pencils is $\text{Rs.}\,63$. The cost (in Rupees) of one pen is

(A) 6

(B) 9

(C) 12

(D) 8

Q15. If α and β are the roots of $x^2 - 7x + 10 = 0$, then the value of $\alpha^2 + \beta^2$ is

(A) 39

(B) 19

(C) 29

(D) 49

Q16. The number of integral values of x satisfying $-3 < 2x - 1 \leq 5$ is

(A) 5

(B) 3

(C) 6

(D) 4

Q17. The sum of the first 20 terms of the arithmetic progression $3, 7, 11, 15, \ldots$ is

(A) 810

(B) 820

(C) 800

(D) 840

Q18. The number of ways in which the letters of the word `LEADER` can be arranged is

(A) 360

(B) 720

(C) 120

(D) 180

Q19. A committee of 3 men and 2 women is to be formed from 6 men and 4 women. The number of ways of forming such a committee is

(A) 90

(B) 60

(C) 120

(D) 200

Q20. A bag contains 4 red and 6 green balls. Two balls are drawn at random together. The probability that both are red is

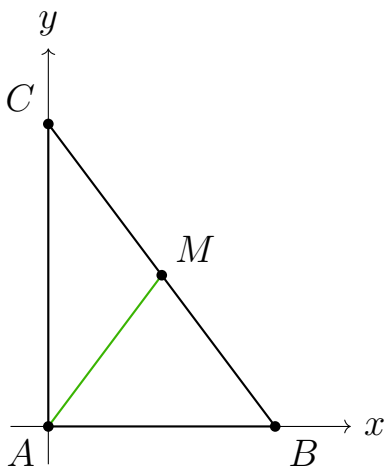
(A) $\frac{1}{5}$

(B) $\frac{2}{15}$

(C) $\frac{1}{3}$

(D) $\frac{4}{15}$

Q21. In the coordinate plane, the triangle with vertices $A(0,0)$, $B(6,0)$ and $C(0,8)$ is shown. The length of the median from A to side BC (in units) is



(A) 4

(B) 6

(C) 4.5

(D) 5

Q22. In a right-angled triangle, one acute angle is twice the other. The smaller acute angle measures

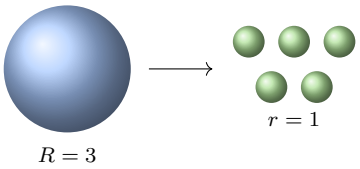
(A) 30°

(B) 45°

(C) 60°

(D) 20°

Q23. A solid sphere of radius 3 cm is melted and recast into a number of small spheres each of radius 1 cm. The number of small spheres formed is



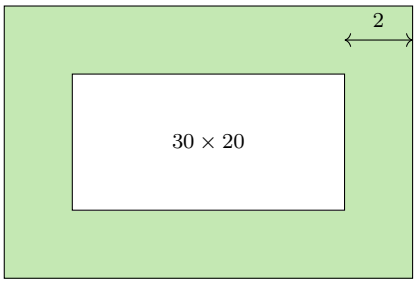
(A) 9

(B) 18

(C) 27

(D) 36

Q24. A rectangular lawn 30 m long and 20 m wide has a path of uniform width 2 m running all around it on the outside. The area (in m^2) of the path is



(A) 208

(B) 216

(C) 200

(D) 224

Q25. The value of $\log_2 8 + \log_3 27 - \log_5 25$ is

(A) 2

(B) 6

(C) 5

(D) 4

Q26. In a class of 50 students, 30 play cricket, 25 play football and 10 play both. The number of students who play neither game is

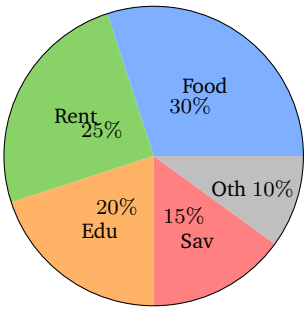
(A) 5

(B) 15

(C) 10

(D) 20

Q27. **Directions (Q27–Q29):** The pie chart shows how a family of monthly income Rs. 36,000 spends its budget across five heads.



The amount (in Rupees) the family spends on Rent is

(A) 10,800

(B) 7,200

(C) 9,000

(D) 5,400

Q28. (Refer to the pie chart in Q27.) The amount spent on Food exceeds the amount saved by (in Rupees)

(A) 4,800

(B) 5,400

(C) $6{,}000$

(D) $3{,}600$

Q29. (Refer to the pie chart in Q27.) The central angle (in degrees) of the sector representing Education is

(A) 54°

(B) 90°

(C) 108°

(D) 72°

Q30. **Data Sufficiency:** Is the integer n divisible by 6?

Statement I: n is divisible by 3.
Statement II: n is divisible by 4.

Choose the correct option:

(A) Both statements together are sufficient, but neither alone is sufficient.

(B) Statement I alone is sufficient, but Statement II alone is not.

(C) Each statement alone is sufficient.

(D) Statement II alone is sufficient, but Statement I alone is not.

Part II (Q31–Q60)

Q31. The remainder when 2^{64} is divided by 7 is

(A) 1

(B) 4

(C) 2

(D) 5

Q32. The number of positive divisors of 360 is

(A) 24

(B) 18

(C) 12

(D) 36

Q33. In an alloy, copper and zinc are in the ratio $3 : 2$. If the total weight is reduced by 20% but the ratio is kept the same, the percentage of copper in the new alloy is

(A) 50%

(B) 60%

(C) 40%

(D) 48%

Q34. A number is increased by 10% and the result is then increased by 10%. The overall percentage increase over the original number is

(A) 20%

(B) 22%

(C) 11%

(D) 21%

Q35. If $a : b = 2 : 3$ and $b : c = 4 : 5$, then $a : c$ equals

(A) $8 : 15$

(B) $2 : 5$

(C) $3 : 5$

(D) $8 : 5$

Q36. In what ratio must rice costing $\text{Rs. } 30$ per kg be mixed with rice costing $\text{Rs. } 45$ per kg so that the mixture costs $\text{Rs. } 35$ per kg?

(A) $1 : 2$

(B) $3 : 2$

(C) $2 : 1$

(D) $1 : 1$

Q37. The cost price of 20 articles is equal to the selling price of 16 articles. The profit percentage is

(A) 20%

(B) 25%

(C) 16%

(D) 30%

Q38. A retailer offers two successive discounts of 20% and 25% on an article. The single equivalent discount is

(A) 45%

(B) 50%

(C) 35%

(D) 40%

Q39. At what rate percent per annum will a sum of $\text{Rs. } 4000$ amount to $\text{Rs. } 4410$ in 2 years, compounded annually?

(A) 5%

(B) 6%

(C) 4%

(D) 7%

Q40. A car covers a certain distance at 60 km/h and returns over the same route at 40 km/h. Its average speed (in km/h) for the whole journey is

(A) 50

(B) 52

(C) 48

(D) 45

Q41. A train 150 m long passes a platform 350 m long in 25 seconds. The speed of the train (in km/h) is

(A) 60

(B) 72

(C) 54

(D) 80

Q42. 6 men or 9 women can do a piece of work in 20 days. In how many days can 4 men and 6 women together complete the same work?

(A) 15

(B) 12

(C) 18

(D) 10

Q43. Two pipes A and B can fill a tank in 20 minutes and 30 minutes respectively. If both are opened together, the time (in minutes) to fill the tank is

(A) 10

(B) 15

(C) 12

(D) 25

Q44. The present ages of a father and his son are in the ratio $7 : 2$. After 18 years the ratio of their ages will be $2 : 1$. The present age of the father (in years) is

(A) 28

(B) 35

(C) 49

(D) 42

Q45. For what value of k does the quadratic equation $x^2 - kx + 9 = 0$ have equal roots (taking the positive value)?

(A) 3

(B) 6

(C) 9

(D) 12

Q46. The solution set of the inequality $x^2 - 5x + 6 < 0$ is

(A) $2 < x < 3$

(B) $x < 2$ or $x > 3$

(C) $-3 < x < -2$

(D) $x > 3$ only

Q47. The sum of the infinite geometric series $1 + \frac{1}{3} + \frac{1}{9} + \frac{1}{27} + \cdots$ is

(A) 2

(B) $\frac{4}{3}$

(C) $\frac{9}{4}$

(D) $\frac{3}{2}$

Q48. In how many ways can 5 people be seated around a circular table?

(A) 120

(B) 60

(C) 24

(D) 48

Q49. The number of ways to choose 2 cards from a standard pack of 52 cards so that both are aces is

(A) 4

(B) 6

(C) 12

(D) 8

Q50. A fair die is rolled once. The probability of getting a number greater than 4 is

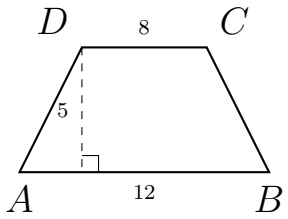
(A) $\frac{1}{3}$

(B) $\frac{1}{2}$

(C) $\frac{2}{3}$

(D) $\frac{1}{6}$

Q51. In the figure, $ABCD$ is a trapezium with $AB \parallel DC$, $AB = 12$ cm, $DC = 8$ cm and the perpendicular height $= 5$ cm. Its area (in cm^2) is



(A) 40

(B) 60

(C) 48

(D) 50

Q52. Each interior angle of a regular polygon measures 144°. The number of sides of the polygon is

(A) 8

(B) 10

(C) 12

(D) 9

Q53. The total surface area of a cube is 294 cm^2. Its volume (in cm^3) is

(A) 343

(B) 216

(C) 512

(D) 294

Q54. An equilateral triangle has side 12 cm. Its area (in cm^2) is

(A) $72\sqrt{3}$

(B) $18\sqrt{3}$

(C) $36\sqrt{3}$

(D) $48\sqrt{3}$

Q55. The value of $\dfrac{1}{\sqrt{5}-\sqrt{3}}$, after rationalising the denominator, is

(A) $\dfrac{\sqrt{5}-\sqrt{3}}{2}$

(B) $\dfrac{\sqrt{5}+\sqrt{3}}{2}$

(C) $\sqrt{5}+\sqrt{3}$

(D) $\dfrac{\sqrt{5}+\sqrt{3}}{8}$

Q56. If $f(x)=2x-3$ and $g(x)=x^2$, then $(f\circ g)(2)$ equals

(A) 1

(B) 7

(C) 9

(D) 5

Q57. **Directions (Q57–Q59):** The table shows the number of units (in thousands) produced by a factory across four quarters of a year.

Quarter	Q1	Q2	Q3	Q4
Units (000s)	40	50	30	60

The total number of units (in thousands) produced in the year is

(A) 180

(B) 170

(C) 160

(D) 190

Q58. (Refer to the table in Q57.) The percentage increase in production from Q3 to Q4 is

(A) 50%

(B) 80%

(C) 100%

(D) 90%

Q59. (Refer to the table in Q57.) The average production per quarter (in thousands of units) is

(A) 40

(B) 45

(C) 50

(D) 42

Q60. Data Sufficiency: What is the value of the two-digit positive integer N?

Statement I: The sum of the digits of N is 9.
Statement II: N is a multiple of 45 and $N < 50$.

Choose the correct option:

(A) Statement I alone is sufficient, but Statement II alone is not.

(B) Both statements together are sufficient, but neither alone is sufficient.

(C) Each statement alone is sufficient.

(D) Statement II alone is sufficient, but Statement I alone is not.

Detailed Solutions

Q1.

Solution

Concept — Cyclicity of unit digits: The unit digit of powers of 7 repeats in the cycle $7, 9, 3, 1$ with period 4.

Step 1 — List the cycle: 7^1 ends in 7, 7^2 in 9, 7^3 in 3, 7^4 in 1.

Step 2 — Reduce the exponent modulo 4: $95 = 4 \times 23 + 3$, so the remainder is 3.

Step 3 — Read off the cycle: A remainder of 3 corresponds to the 3rd entry, which is 3.

Why other options are wrong:

- 1 would need the exponent to be a multiple of 4.
- 7 and 9 correspond to remainders 1 and 2.

Final Answer: unit digit $= 3 \Rightarrow$ B

Answer: (B) Go Back to Q1

Q2.

Solution

Concept — Common remainder: A number leaving the same remainder r on division by several divisors has the form (LCM of divisors)$\times k + r$.

Step 1 — LCM of $12, 15, 20$: $12 = 2^2 \cdot 3$, $15 = 3 \cdot 5$, $20 = 2^2 \cdot 5$, so LCM $= 2^2 \cdot 3 \cdot 5 = 60$.

Step 2 — Add the remainder: The least such number is $60 + 5 = 65$.

Why other options are wrong:

- 55 and 70 are not of the form $60k + 5$.
- 60 leaves remainder 0, not 5.

Final Answer: least number $= 65 \Rightarrow$ C

Answer: (C) Go Back to Q2

Q3.

Solution

Concept — Successive percentage growth: Present $=$ Past $\times(1+r_1)(1+r_2)$.

Step 1 — Write the relation: Past $\times$ 1.10 $\times$ 1.20 $=$ $13{,}200$.

Step 2 — Combine the factors: $1.10 \times 1.20 = 1.32$.

Step 3 — Solve: Past $= \dfrac{13{,}200}{1.32} = 10{,}000$.

Why other options are wrong:

- $11{,}000$ applies only one year of growth.
- $9{,}000$ and $12{,}000$ use a wrong combined factor.

Final Answer: population two years ago $= 10{,}000 \Rightarrow$ A

Answer: (A) Go Back to Q3

Q4.

Solution

Concept — Reverse percentage: If A is $x\%$ more than B, the percentage by which B is less than A is $\dfrac{x}{100+x} \times 100$.

Step 1 — Take $B = 100$: Then $A = 125$.

Step 2 — Difference: $A - B = 125 - 100 = 25$.

Step 3 — As a percentage of A: $\dfrac{25}{125} \times 100 = 20\%$.

Why other options are wrong:

- 25% wrongly takes the difference over B instead of A.
- 30% and 24% use a wrong base.

Final Answer: B is less by $20\% \Rightarrow$ D

Answer: (D) Go Back to Q4

Q5.

Solution

Concept — Ratio with subtraction: Let the numbers be $5k$ and $7k$ and form an equation from the new ratio.

Step 1 — Set up: $\dfrac{5k-6}{7k-6}=\dfrac{2}{3}$.

Step 2 — Cross-multiply: $3(5k-6)=2(7k-6)$, i.e. $15k-18=14k-12$.

Step 3 — Solve for k: $15k-14k=-12+18 \Rightarrow k=6$.

Step 4 — Larger number: $7k=7\times 6=42$.

Why other options are wrong:

- 35 is $5k$ with $k=7$, an incorrect k.
- 30 and 49 use wrong values of k.

Final Answer: larger number $=42 \Rightarrow$ B

Answer: (B) Go Back to Q5

Q6.

Solution

Concept — Replacement and average change: The total weight rises by (number of persons)$\times$(increase in average).

Step 1 — Total increase: $8\times 2.5=20$ kg.

Step 2 — New person's weight: The replaced person weighed 56 kg, so the new person weighs $56+20=76$ kg.

Why other options are wrong:

- 68 adds only part of the total increase.
- 72 and 80 use a wrong total increase.

Final Answer: new person $=76$ kg $\Rightarrow$ A

Answer: (A) Go Back to Q6

Q7.

Solution

Concept — Equal SP with equal gain and loss percent: When two items are sold at the same price with $x\%$ gain on one and $x\%$ loss on the other, there is always a net loss of $\left(\frac{x}{10}\right)^2\%$.

Step 1 — Cost of the gain article: $\dfrac{1980}{1.10} = 1800$.

Step 2 — Cost of the loss article: $\dfrac{1980}{0.90} = 2200$.

Step 3 — Compare totals: Total cost $= 1800 + 2200 = 4000$; total SP $= 1980 + 1980 = 3960$.

Step 4 — Net result: Loss $= 4000 - 3960 = 40$; percentage $= \dfrac{40}{4000} \times 100 = 1\%$ loss.

Why other options are wrong:

- "Gain of 1%" has the sign wrong.
- "No profit no loss" ignores the unequal cost prices; "loss of 2%" miscomputes.

Final Answer: loss of $1\% \Rightarrow \boxed{\text{C}}$

Answer: (C) Go Back to Q7

Q8.

Solution

Concept — Marked price from discount and profit: SP $=$ MP $\times (1 - d)$ and SP $=$ CP $\times (1 + p)$.

Step 1 — Required selling price: $600 \times 1.20 = 720$.

Step 2 — Relate to marked price: MP $\times\, 0.80 = 720$.

Step 3 — Solve: MP $= \dfrac{720}{0.80} = 900$.

Why other options are wrong:

- 840 uses the profit but not the discount.
- 720 is the selling price, not the marked price; 960 uses a wrong factor.

Final Answer: marked price $= \text{Rs. } 900 \Rightarrow \boxed{\text{D}}$

Answer: (D) Go Back to Q8

Q9.

Solution

Concept — Doubling under simple interest: If a sum doubles in T years, the interest earned in T years equals the principal.

Step 1 — Interest to double: In 8 years SI $=$ principal P, so the SI rate gives P of interest in 8 years.

Step 2 — Interest to become five times: To become $5P$, the interest needed is $4P$.

Step 3 — Scale the time: Since P of interest takes 8 years, $4P$ takes $4 \times 8 = 32$ years.

Why other options are wrong:

- 40 corresponds to becoming six times.
- 24 corresponds to four times; 36 uses a wrong multiple.

Final Answer: 32 years $\Rightarrow$ $\boxed{\text{B}}$

Answer: (B) Go Back to Q9

Q10.

Solution

Concept — Stream speed: Downstream speed $= b + s$, upstream speed $= b - s$; the stream speed is half their difference.

Step 1 — Downstream speed: $\dfrac{30}{3} = 10$ km/h.

Step 2 — Upstream speed: $\dfrac{30}{5} = 6$ km/h.

Step 3 — Stream speed: $\dfrac{10 - 6}{2} = \dfrac{4}{2} = 2$ km/h.

Why other options are wrong:

- 4 is the difference of the two speeds, not half of it.
- 3 and 1 use wrong arithmetic.

Final Answer: stream speed $= 2$ km/h $\Rightarrow$ $\boxed{\text{A}}$

Answer: (A) Go Back to Q10

Q11.

Solution

Concept — Trains in opposite directions: The crossing time uses the sum of the lengths over the sum of the speeds.

Step 1 — Relative speed: $54 + 36 = 90$ km/h $= 90 \times \frac{5}{18} = 25$ m/s.

Step 2 — Total length: $120 + 180 = 300$ m.

Step 3 — Time: $\dfrac{300}{25} = 12$ seconds.

Why other options are wrong:

- 15 and 18 use a wrong relative speed.
- 10 uses only one train's length.

Final Answer: time $= 12$ s $\Rightarrow$ C

Answer: (C) Go Back to Q11

Q12.

Solution

Concept — Combined work then one worker: Find the work done together, then let the remaining worker finish, using LCM units.

Step 1 — Total work in units: Take total work $= \text{LCM}(10, 15) = 30$ units.

Step 2 — Daily rates: A does $\frac{30}{10} = 3$ units/day; B does $\frac{30}{15} = 2$ units/day.

Step 3 — Work in the first 4 days together: $(3 + 2) \times 4 = 5 \times 4 = 20$ units.

Step 4 — Remaining work: $30 - 20 = 10$ units.

Step 5 — B finishes alone: $\dfrac{10}{2} = 5$ days.

Why other options are wrong:

- 4 and 6 miscount the remaining 10 units.
- 7 uses a wrong rate for B.

Final Answer: B takes 5 more days $\Rightarrow$ D

Answer: (D) Go Back to Q12

Q13.

Solution

Concept — Fill and empty pipes together: Net rate = fill rate − empty rate.

Step 1 — Rates: A fills $\frac{1}{6}$ per hour, B empties $\frac{1}{9}$ per hour.

Step 2 — Net rate: $\frac{1}{6} - \frac{1}{9} = \frac{3-2}{18} = \frac{1}{18}$ per hour.

Step 3 — Time to fill: $\dfrac{1}{1/18} = 18$ hours.

Why other options are wrong:

- 15, 12 and 20 use a wrong net rate.

Final Answer: time $= 18$ hours $\Rightarrow$ A

Answer: (A) Go Back to Q13

Q14.

Solution

Concept — Two linear equations: Let pen $= p$, pencil $= q$; solve the system.

Step 1 — Set up: $3p + 5q = 57$ and $5p + 3q = 63$.

Step 2 — Add the equations: $8p + 8q = 120 \Rightarrow p + q = 15$.

Step 3 — Subtract the equations: $(5p + 3q) - (3p + 5q) = 63 - 57$, i.e. $2p - 2q = 6 \Rightarrow p - q = 3$.

Step 4 — Solve: Adding $p + q = 15$ and $p - q = 3$ gives $2p = 18 \Rightarrow p = 9$.

Why other options are wrong:

- 6 is the value of the pencil, not the pen.
- 12 and 8 do not satisfy both equations.

Final Answer: one pen $= \text{Rs. } 9 \Rightarrow$ B

Answer: (B) Go Back to Q14

Q15.

Solution

Concept — Sum and product of roots: For $x^2 - 7x + 10 = 0$, $\alpha + \beta = 7$ and $\alpha\beta = 10$; use $\alpha^2 + \beta^2 = (\alpha + \beta)^2 - 2\alpha\beta$.

Step 1 — Square the sum: $(\alpha + \beta)^2 = 7^2 = 49$.

Step 2 — Subtract twice the product: $49 - 2 \times 10 = 49 - 20 = 29$.

Why other options are wrong:

- 49 forgets to subtract $2\alpha\beta$.
- 39 and 19 subtract the wrong amount.

Final Answer: $\alpha^2 + \beta^2 = 29 \Rightarrow \boxed{\text{C}}$

Answer: (C) Go Back to Q15

Q16.

Solution

Concept — Compound linear inequality: Solve $-3 < 2x - 1 \leq 5$ by isolating x, then count integers.

Step 1 — Add 1 throughout: $-2 < 2x \leq 6$.

Step 2 — Divide by 2: $-1 < x \leq 3$.

Step 3 — Count integers: Integers strictly greater than -1 and at most 3 are $0, 1, 2, 3$, that is 4 values.

Why other options are wrong:

- 5 wrongly includes -1.
- 3 drops one endpoint; 6 widens the range.

Final Answer: 4 integers $\Rightarrow \boxed{\text{D}}$

Answer: (D) Go Back to Q16

Q17.

Solution

Concept — Sum of an AP: $S_n = \frac{n}{2}\,[2a + (n-1)d]$.

Step 1 — Identify parameters: $a = 3$, $d = 4$, $n = 20$.

Step 2 — Substitute: $S_{20} = \frac{20}{2}\,[2(3) + 19(4)] = 10\,[6 + 76]$.

Step 3 — Evaluate: $10 \times 82 = 820$.

Why other options are wrong:

- 810 and 840 mis-evaluate $2a + (n-1)d$.
- 800 rounds incorrectly.

Final Answer: $S_{20} = 820 \Rightarrow$ B

Answer: (B) Go Back to Q17

Q18.

Solution

Concept — Permutations with a repeated letter: For n letters with one letter repeated p times, arrangements $= \frac{n!}{p!}$.

Step 1 — Count letters: `LEADER` has 6 letters with E repeated twice.

Step 2 — Apply the formula: $\dfrac{6!}{2!} = \dfrac{720}{2} = 360$.

Why other options are wrong:

- 720 ignores the repeated E.
- 120 and 180 divide by the wrong factorial.

Final Answer: 360 arrangements $\Rightarrow$ A

Answer: (A) Go Back to Q18

Q19.

Solution

Concept — Selection with independent groups: Multiply the ways of choosing men by the ways of choosing women.

Step 1 — Choose 3 men from 6: $\binom{6}{3} = 20$.

Step 2 — Choose 2 women from 4: $\binom{4}{2} = 6$.

Step 3 — Multiply: $20 \times 6 = 120$.

Why other options are wrong:

- 90 and 60 use a wrong combination value.
- 200 multiplies incorrectly.

Final Answer: 120 committees $\Rightarrow$ C

Answer: (C) Go Back to Q19

Q20.

Solution

Concept — Probability of drawing two of a kind: $P = \dfrac{\binom{\text{favourable}}{2}}{\binom{\text{total}}{2}}$.

Step 1 — Favourable ways: Both red: $\binom{4}{2} = 6$.

Step 2 — Total ways: Any two from 10: $\binom{10}{2} = 45$.

Step 3 — Probability: $\dfrac{6}{45} = \dfrac{2}{15}$.

Why other options are wrong:

- $\frac{1}{5}$ and $\frac{4}{15}$ use a wrong count.
- $\frac{1}{3}$ ignores that draws are without replacement.

Final Answer: probability $= \dfrac{2}{15} \Rightarrow$ B

Answer: (B) Go Back to Q20

Q21.

Solution

Concept — Median length by midpoint and distance formula: The median from A goes to the midpoint M of BC; its length is the distance AM.

Step 1 — Midpoint of BC: $M = \left(\frac{6+0}{2}, \frac{0+8}{2}\right) = (3, 4)$.

Step 2 — Distance AM: $AM = \sqrt{(3-0)^2 + (4-0)^2} = \sqrt{9+16}$.

Step 3 — Evaluate: $\sqrt{25} = 5$.

Why other options are wrong:

- 4 and 6 are individual coordinates, not the distance.
- 4.5 averages the legs incorrectly.

Final Answer: median $= 5$ units $\Rightarrow$ $\boxed{\text{D}}$

Answer: (D) Go Back to Q21

Q22.

Solution

Concept — Angle sum in a right triangle: The two acute angles add up to $90°$.

Step 1 — Let the smaller angle be x: Then the other is $2x$.

Step 2 — Form the equation: $x + 2x = 90°$.

Step 3 — Solve: $3x = 90° \Rightarrow x = 30°$.

Why other options are wrong:

- $60°$ is the larger acute angle.
- $45°$ assumes equal angles; $20°$ does not satisfy the sum.

Final Answer: smaller angle $= 30° \Rightarrow$ $\boxed{\text{A}}$

Answer: (A) Go Back to Q22

Q23.

Solution

Concept — Conservation of volume on recasting: The total volume stays constant, so number $= \dfrac{\text{volume of large sphere}}{\text{volume of one small sphere}}$.

Step 1 — Volume ratio: $\dfrac{\frac{4}{3}\pi R^3}{\frac{4}{3}\pi r^3} = \left(\dfrac{R}{r}\right)^3$.

Step 2 — Substitute $R = 3$, $r = 1$: $\left(\dfrac{3}{1}\right)^3 = 27$.

Why other options are wrong:

- 9 uses the square of the ratio.
- 18 and 36 are not perfect cubes of 3.

Final Answer: 27 small spheres $\Rightarrow$ C

Answer: (C) Go Back to Q23

Q24.

Solution

Concept — Area of a surrounding path: Path area $=$ (outer rectangle area) $-$ (inner lawn area).

Step 1 — Outer dimensions: A 2 m path on all sides adds 4 m to each dimension: 34×24.

Step 2 — Areas: Outer $= 34 \times 24 = 816$ m^2; inner $= 30 \times 20 = 600$ m^2.

Step 3 — Path area: $816 - 600 = 216$ m^2.

Why other options are wrong:

- 208 adds only 2 m (not 4) to each dimension.
- 200 and 224 use wrong outer dimensions.

Final Answer: path area $= 216$ m^2 $\Rightarrow$ B

Answer: (B) Go Back to Q24

Q25.

Solution

Concept — Logarithm of a power: $\log_b b^k = k$.

Step 1 — Evaluate each term: $\log_2 8 = \log_2 2^3 = 3$; $\log_3 27 = \log_3 3^3 = 3$; $\log_5 25 = \log_5 5^2 = 2$.

Step 2 — Combine: $3 + 3 - 2 = 4$.

Why other options are wrong:

- 6 forgets to subtract the last term.
- 2 and 5 mis-evaluate the individual logs.

Final Answer: value $= 4 \Rightarrow$ $\boxed{\text{D}}$

Answer: (D) Go Back to Q25

Q26.

Solution

Concept — Inclusion–exclusion: Number playing at least one game $= |C| + |F| - |C \cap F|$; the rest play neither.

Step 1 — At least one game: $30 + 25 - 10 = 45$.

Step 2 — Neither game: $50 - 45 = 5$.

Why other options are wrong:

- 15 forgets to subtract the overlap.
- 10 and 20 use a wrong overlap.

Final Answer: 5 students play neither $\Rightarrow$ $\boxed{\text{A}}$

Answer: (A) Go Back to Q26

Q27.

Solution

Concept — Pie chart percentages of a total: Each head's amount = its percentage × total income.

Step 1 — Rent percentage: The chart shows Rent = 25%.

Step 2 — Compute the amount: 25% of 36,000 = 0.25 × 36,000 = 9,000.

Why other options are wrong:

- 10,800 is the Food amount (30%).
- 7,200 is Education (20%); 5,400 is Savings (15%).

Final Answer: Rent = Rs. 9,000 ⇒ C

Answer: (C) Go Back to Q27

Q28.

Solution

Concept — Difference of two pie-chart amounts: Subtract the two corresponding amounts.

Step 1 — Food amount: 30% of 36,000 = 10,800.

Step 2 — Savings amount: 15% of 36,000 = 5,400.

Step 3 — Difference: 10,800 − 5,400 = 5,400.

Why other options are wrong:

- 4,800 and 3,600 use wrong percentages.
- 6,000 rounds incorrectly.

Final Answer: difference = Rs. 5,400 ⇒ B

Answer: (B) Go Back to Q28

Q29.

Solution

Concept — Central angle from percentage: Central angle $=$ percentage $\times 360°$.

Step 1 — Education percentage: 20%.

Step 2 — Convert to degrees: $0.20 \times 360° = 72°$.

Why other options are wrong:

- $54°$ is Savings (15%).
- $90°$ is Rent (25%); $108°$ is Food (30%).

Final Answer: central angle $= 72° \Rightarrow$ D

Answer: (D) Go Back to Q29

Q30.

Solution

Concept — Divisibility data sufficiency: A number is divisible by 6 iff it is divisible by both 2 and 3.

Step 1 — Statement I alone: Divisible by 3 only; says nothing about 2. Not sufficient (e.g. 9 is not divisible by 6).

Step 2 — Statement II alone: Divisible by 4 means divisible by 2, but not necessarily by 3 (e.g. 4). Not sufficient.

Step 3 — Both together: Divisible by 3 and by 4 implies divisible by 2 and 3, hence by 6. Sufficient together.

Why other options are wrong:

- Neither statement alone settles both factors, so options claiming a single statement suffices are wrong.

Final Answer: both together are sufficient, neither alone $\Rightarrow$ A

Answer: (A) Go Back to Q30

Q31.

Solution

Concept — Remainder by cyclicity: Powers of 2 modulo 7 cycle as $2, 4, 1$ with period 3.

Step 1 — The cycle: $2^1 \equiv 2$, $2^2 \equiv 4$, $2^3 \equiv 1 \pmod 7$.

Step 2 — Reduce the exponent modulo 3: $64 = 3 \times 21 + 1$, remainder 1.

Step 3 — Read the cycle: A remainder of 1 gives $2^1 \equiv 2 \pmod 7$.

Why other options are wrong:

- 1 and 4 correspond to remainders 0 and 2.
- 5 never occurs in the cycle.

Final Answer: remainder $= 2 \Rightarrow$ C

Answer: (C) Go Back to Q31

Q32.

Solution

Concept — Counting divisors: For $N = p_1^{a_1} p_2^{a_2} \cdots$, the number of divisors is $(a_1 + 1)(a_2 + 1) \cdots$.

Step 1 — Factorise: $360 = 2^3 \times 3^2 \times 5^1$.

Step 2 — Apply the formula: $(3 + 1)(2 + 1)(1 + 1) = 4 \times 3 \times 2$.

Step 3 — Evaluate: $4 \times 3 \times 2 = 24$.

Why other options are wrong:

- 18 and 12 mis-add the exponents.
- 36 multiplies the exponents instead of (exponent+1).

Final Answer: 24 divisors $\Rightarrow$ A

Answer: (A) Go Back to Q32

Q33.

Solution

Concept — Ratio is scale-invariant: Scaling total weight does not change the percentage of any component, since the ratio is unchanged.

Step 1 — Copper fraction: With ratio $3:2$, copper $= \dfrac{3}{3+2} = \dfrac{3}{5}$ of the alloy.

Step 2 — Convert to percentage: $\dfrac{3}{5} \times 100 = 60\%$.

Step 3 — Effect of 20% reduction: Since the ratio is kept the same, the percentage stays 60%.

Why other options are wrong:

- 50% and 40% ignore the $3:2$ split.
- 48% wrongly applies the 20% reduction to the percentage.

Final Answer: copper $= 60\% \Rightarrow \boxed{\text{B}}$

Answer: (B) Go Back to Q33

Q34.

Solution

Concept — Two successive equal increases: Overall factor $= (1+r)^2$.

Step 1 — Take the number $= 100$: After first 10%: 110.

Step 2 — Second 10%: $110 \times 1.10 = 121$.

Step 3 — Overall increase: $121 - 100 = 21$, i.e. 21%.

Why other options are wrong:

- 20% simply adds the two rates.
- 22% and 11% mis-handle the compounding.

Final Answer: overall increase $= 21\% \Rightarrow \boxed{\text{D}}$

Answer: (D) Go Back to Q34

Q35.

Solution

Concept — Chaining ratios: Make b common, then read $a : c$.

Step 1 — Write both ratios: $a : b = 2 : 3$ and $b : c = 4 : 5$.

Step 2 — Make b equal: Multiply the first by 4 and the second by 3: $a : b = 8 : 12$ and $b : c = 12 : 15$.

Step 3 — Combine: $a : b : c = 8 : 12 : 15$, so $a : c = 8 : 15$.

Why other options are wrong:

- $2 : 5$ and $3 : 5$ drop the chaining step.
- $8 : 5$ uses the wrong c.

Final Answer: $a : c = 8 : 15 \Rightarrow$ A

Answer: (A) Go Back to Q35

Q36.

Solution

Concept — Alligation: Ratio of quantities $= \dfrac{\text{dearer price} - \text{mean}}{\text{mean} - \text{cheaper price}}$.

Step 1 — Differences: Dearer $-$ mean $= 45 - 35 = 10$; mean $-$ cheaper $= 35 - 30 = 5$.

Step 2 — Ratio cheaper : dearer: $\dfrac{10}{5} = \dfrac{2}{1}$, so cheaper : dearer $= 2 : 1$.

Why other options are wrong:

- $1 : 2$ inverts the ratio.
- $3 : 2$ and $1 : 1$ use wrong differences.

Final Answer: ratio $= 2 : 1 \Rightarrow$ C

Answer: (C) Go Back to Q36

Q37.

Solution

Concept — CP of m articles $=$ SP of n articles: Profit% $= \dfrac{m-n}{n} \times 100$.

Step 1 — Identify m and n: $m = 20$, $n = 16$.

Step 2 — Apply the formula: $\dfrac{20-16}{16} \times 100 = \dfrac{4}{16} \times 100$.

Step 3 — Evaluate: $\dfrac{1}{4} \times 100 = 25\%$.

Why other options are wrong:

- 20% divides by 20 instead of 16.
- 16% and 30% use wrong differences.

Final Answer: profit $= 25\% \Rightarrow$ B

Answer: (B) Go Back to Q37

Q38.

Solution

Concept — Single equivalent of two discounts: Net factor $= (1-d_1)(1-d_2)$; single discount $= 1-$ that factor.

Step 1 — Multiply the retained fractions: $(1-0.20)(1-0.25) = 0.80 \times 0.75 = 0.60$.

Step 2 — Single discount: $1 - 0.60 = 0.40$, i.e. 40%.

Why other options are wrong:

- 45% simply adds the two discounts.
- 50% and 35% mis-multiply the factors.

Final Answer: single discount $= 40\% \Rightarrow$ D

Answer: (D) Go Back to Q38

Q39.

Solution

Concept — Compound amount equation: $A = P(1+r)^2$; solve for r.

Step 1 — Set up: $4000(1+r)^2 = 4410$.

Step 2 — Isolate the square: $(1+r)^2 = \dfrac{4410}{4000} = 1.1025$.

Step 3 — Take the square root: $1+r = 1.05$, so $r = 0.05 = 5\%$.

Why other options are wrong:

- 6% gives $(1.06)^2 = 1.1236$, too large.
- 4% and 7% do not match 1.1025.

Final Answer: rate $= 5\% \Rightarrow \boxed{\text{A}}$

Answer: (A) Go Back to Q39

Q40.

Solution

Concept — Average speed for equal distances: For the same distance each way, average speed $= \dfrac{2v_1v_2}{v_1+v_2}$ (harmonic mean).

Step 1 — Substitute: $v_1 = 60$, $v_2 = 40$.

Step 2 — Numerator: $2 \times 60 \times 40 = 4800$.

Step 3 — Denominator and result: $60 + 40 = 100$; average $= \dfrac{4800}{100} = 48$ km/h.

Why other options are wrong:

- 50 is the arithmetic mean, which is wrong here.
- 52 and 45 do not follow from the harmonic mean.

Final Answer: average speed $= 48$ km/h $\Rightarrow \boxed{\text{C}}$

Answer: (C) Go Back to Q40

Q41.

Solution

Concept — Train crossing a platform: The train covers (its length + platform length) in the given time.

Step 1 — Total distance: $150 + 350 = 500$ m.

Step 2 — Speed in m/s: $\frac{500}{25} = 20$ m/s.

Step 3 — Convert to km/h: $20 \times \frac{18}{5} = 72$ km/h.

Why other options are wrong:

- 60 and 54 use only one length or a wrong conversion.
- 80 overstates the speed.

Final Answer: speed $= 72$ km/h $\Rightarrow$ $\boxed{\text{B}}$

Answer: (B) Go Back to Q41

Q42.

Solution

Concept — Men and women work rates: Use the given equivalence to express everything in one unit of work.

Step 1 — Total work: 6 men $\times 20$ days $= 120$ man-days; also 9 women $\times 20 = 180$ woman-days. So 120 man-days $= 180$ woman-days, giving 1 man $= 1.5$ women.

Step 2 — Convert the new team to women: 4 men $= 6$ women, so 4 men $+6$ women $= 12$ women.

Step 3 — Days for 12 women: Total work $= 180$ woman-days, so time $= \frac{180}{12} = 15$ days.

Why other options are wrong:

- 12 and 10 overstate the team's strength.
- 18 understates it.

Final Answer: 15 days $\Rightarrow$ $\boxed{\text{A}}$

Answer: (A) Go Back to Q42

Q43.

Solution

Concept — Two filling pipes together: Combined rate = sum of individual rates; time = reciprocal.

Step 1 — Individual rates: $A = \frac{1}{20}$, $B = \frac{1}{30}$ per minute.

Step 2 — Combined rate: $\frac{1}{20} + \frac{1}{30} = \frac{3+2}{60} = \frac{5}{60} = \frac{1}{12}$ per minute.

Step 3 — Time to fill: $\dfrac{1}{1/12} = 12$ minutes.

Why other options are wrong:

- 10 and 15 use a wrong combined rate.
- 25 adds the times, which is invalid.

Final Answer: time $= 12$ minutes $\Rightarrow$ C

Answer: (C) Go Back to Q43

Q44.

Solution

Concept — Ages in ratio: Represent the present ages with a common multiple and use the future ratio.

Step 1 — Present ages: Let father $= 7x$ and son $= 2x$.

Step 2 — After 18 years: $\dfrac{7x+18}{2x+18} = \dfrac{2}{1}$.

Step 3 — Cross-multiply: $7x + 18 = 2(2x + 18) = 4x + 36$.

Step 4 — Solve: $7x - 4x = 36 - 18 \Rightarrow 3x = 18 \Rightarrow x = 6$.

Step 5 — Father's present age: $7x = 7 \times 6 = 42$ years (check: now $42 : 12$, after 18 years $60 : 30 = 2 : 1$).

Why other options are wrong:

- 28, 35 and 49 give other values of x that fail the future ratio.

Final Answer: present father age $= 42$ years $\Rightarrow$ D

Answer: (D) Go Back to Q44

Q45.

Solution

Concept — Equal roots condition: A quadratic ax^2+bx+c has equal roots when its discriminant $b^2-4ac=0$.

Step 1 — Identify coefficients: For x^2-kx+9, $a=1$, $b=-k$, $c=9$.

Step 2 — Set discriminant to zero: $(-k)^2-4(1)(9)=0 \Rightarrow k^2=36$.

Step 3 — Positive value: $k=6$.

Why other options are wrong:

- 3 and 9 do not satisfy $k^2=36$.
- 12 gives a positive discriminant (distinct roots).

Final Answer: $k=6 \Rightarrow$ B

Answer: (B) Go Back to Q45

Q46.

Solution

Concept — Sign of a factored quadratic: $x^2-5x+6=(x-2)(x-3)$ is negative between its roots.

Step 1 — Factorise: $x^2-5x+6=(x-2)(x-3)$.

Step 2 — Locate the roots: The roots are $x=2$ and $x=3$.

Step 3 — Determine the sign: A product of two factors with roots 2 and 3 is negative for $2<x<3$.

Why other options are wrong:

- $x<2$ or $x>3$ is where the expression is positive.
- The negative-interval and "$x>3$ only" options misread the roots.

Final Answer: $2<x<3 \Rightarrow$ A

Answer: (A) Go Back to Q46

Q47.

Solution

Concept — Sum of an infinite GP: For $|r| < 1$, $S_\infty = \dfrac{a}{1-r}$.

Step 1 — Identify a and r: $a = 1$, $r = \frac{1}{3}$.

Step 2 — Apply the formula: $S_\infty = \dfrac{1}{1-\frac{1}{3}} = \dfrac{1}{\frac{2}{3}}$.

Step 3 — Simplify: $\dfrac{1}{\frac{2}{3}} = \dfrac{3}{2}$.

Why other options are wrong:

- 2 and $\frac{9}{4}$ use a wrong ratio.
- $\frac{4}{3}$ mis-computes $1 - r$.

Final Answer: $S_\infty = \dfrac{3}{2} \Rightarrow \boxed{\text{D}}$

Answer: (D) Go Back to Q47

Q48.

Solution

Concept — Circular permutations: The number of ways to seat n people around a round table is $(n-1)!$.

Step 1 — Apply the formula: $(5-1)! = 4!$.

Step 2 — Evaluate: $4! = 24$.

Why other options are wrong:

- 120 is $5!$, the count for a row, not a circle.
- 60 and 48 do not equal $4!$.

Final Answer: 24 ways $\Rightarrow \boxed{\text{C}}$

Answer: (C) Go Back to Q48

Q49.

Solution

Concept — Choosing from a fixed set: The number of ways to pick 2 aces from the 4 aces is $\binom{4}{2}$.

Step 1 — Set up the combination: $\binom{4}{2} = \dfrac{4 \times 3}{2 \times 1}$.

Step 2 — Evaluate: $\dfrac{12}{2} = 6$.

Why other options are wrong:

- 4 counts single aces.
- 12 counts ordered pairs; 8 has no basis.

Final Answer: 6 ways $\Rightarrow$ $\boxed{\text{B}}$

Answer: (B) Go Back to Q49

Q50.

Solution

Concept — Probability of a simple event: $P = \dfrac{\text{favourable outcomes}}{\text{total outcomes}}$.

Step 1 — Favourable outcomes: Numbers greater than 4 on a die are 5 and 6, so 2 outcomes.

Step 2 — Total outcomes: 6.

Step 3 — Probability: $\dfrac{2}{6} = \dfrac{1}{3}$.

Why other options are wrong:

- $\frac{1}{2}$ counts numbers greater than 3.
- $\frac{2}{3}$ and $\frac{1}{6}$ miscount the favourable cases.

Final Answer: probability $= \dfrac{1}{3} \Rightarrow \boxed{\text{A}}$

Answer: (A) Go Back to Q50

Q51.

Solution

Concept — Area of a trapezium: Area $= \frac{1}{2}$(sum of parallel sides) $\times$ height.

Step 1 — Sum of parallel sides: $12 + 8 = 20$ cm.

Step 2 — Apply the formula: Area $= \frac{1}{2} \times 20 \times 5$.

Step 3 — Evaluate: $\frac{1}{2} \times 100 = 50$ cm^2.

Why other options are wrong:

- 40 and 48 use a wrong sum or height.
- 60 multiplies without the factor $\frac{1}{2}$ correctly.

Final Answer: area $= 50$ cm^2 $\Rightarrow$ $\boxed{\text{D}}$

Answer: (D) Go Back to Q51

Q52.

Solution

Concept — Interior angle of a regular polygon: Each interior angle $= \dfrac{(n-2) \times 180^\circ}{n}$.

Step 1 — Set up the equation: $\dfrac{(n-2) \times 180}{n} = 144$.

Step 2 — Clear the fraction: $180(n-2) = 144n$, i.e. $180n - 360 = 144n$.

Step 3 — Solve: $36n = 360 \Rightarrow n = 10$.

Why other options are wrong:

- 8 gives interior angle 135°.
- 12 gives 150°; 9 gives 140°.

Final Answer: $n = 10$ sides $\Rightarrow$ $\boxed{\text{B}}$

Answer: (B) Go Back to Q52

Q53.

Solution

Concept — Cube from surface area: Total surface area $= 6a^2$; find a, then volume $= a^3$.

Step 1 — Solve for a: $6a^2 = 294 \Rightarrow a^2 = 49 \Rightarrow a = 7$ cm.

Step 2 — Volume: $a^3 = 7^3 = 343$ cm^3.

Why other options are wrong:

- 216 and 512 correspond to $a = 6$ and $a = 8$.
- 294 is the surface area, not the volume.

Final Answer: volume $= 343$ cm^3 $\Rightarrow$ A

Answer: (A) Go Back to Q53

Q54.

Solution

Concept — Area of an equilateral triangle: Area $= \frac{\sqrt{3}}{4}a^2$.

Step 1 — Square the side: $a^2 = 12^2 = 144$.

Step 2 — Apply the formula: Area $= \frac{\sqrt{3}}{4} \times 144$.

Step 3 — Simplify: $\frac{144}{4}\sqrt{3} = 36\sqrt{3}$ cm^2.

Why other options are wrong:

- $72\sqrt{3}$ doubles the result.
- $18\sqrt{3}$ and $48\sqrt{3}$ use a wrong factor.

Final Answer: area $= 36\sqrt{3}$ cm^2 $\Rightarrow$ C

Answer: (C) Go Back to Q54

Q55.

Solution

Concept — Rationalising the denominator: Multiply numerator and denominator by the conjugate $\sqrt{5}+\sqrt{3}$.

Step 1 — Multiply by the conjugate: $\dfrac{1}{\sqrt{5}-\sqrt{3}} \times \dfrac{\sqrt{5}+\sqrt{3}}{\sqrt{5}+\sqrt{3}} = \dfrac{\sqrt{5}+\sqrt{3}}{(\sqrt{5})^2-(\sqrt{3})^2}$.

Step 2 — Simplify the denominator: $(\sqrt{5})^2-(\sqrt{3})^2 = 5-3 = 2$.

Step 3 — Result: $\dfrac{\sqrt{5}+\sqrt{3}}{2}$.

Why other options are wrong:

- $\dfrac{\sqrt{5}-\sqrt{3}}{2}$ uses the wrong conjugate sign.
- $\sqrt{5}+\sqrt{3}$ and $\dfrac{\sqrt{5}+\sqrt{3}}{8}$ use a wrong denominator.

Final Answer: $\dfrac{\sqrt{5}+\sqrt{3}}{2} \Rightarrow \boxed{\text{B}}$

Answer: (B) Go Back to Q55

Q56.

Solution

Concept — Composition of functions: $(f \circ g)(x) = f(g(x))$; evaluate the inner function first.

Step 1 — Inner function: $g(2) = 2^2 = 4$.

Step 2 — Outer function: $f(4) = 2(4)-3 = 8-3 = 5$.

Why other options are wrong:

- 1 evaluates f before g.
- 7 and 9 misapply one of the functions.

Final Answer: $(f \circ g)(2) = 5 \Rightarrow \boxed{\text{D}}$

Answer: (D) Go Back to Q56

Q57.

Solution

Concept — Total from a data table: Add the four quarterly values.

Step 1 — List the values: Q1 $= 40$, Q2 $= 50$, Q3 $= 30$, Q4 $= 60$ (in thousands).

Step 2 — Sum them: $40 + 50 + 30 + 60 = 180$.

Why other options are wrong:

- 170 and 160 drop part of a value.
- 190 over-adds.

Final Answer: total $= 180$ thousand units $\Rightarrow$ A

Answer: (A) Go Back to Q57

Q58.

Solution

Concept — Percentage increase: $\text{Increase\%} = \dfrac{\text{new} - \text{old}}{\text{old}} \times 100$.

Step 1 — Identify Q3 and Q4: Q3 $= 30$, Q4 $= 60$.

Step 2 — Compute the rise: $60 - 30 = 30$.

Step 3 — As a percentage of Q3: $\dfrac{30}{30} \times 100 = 100\%$.

Why other options are wrong:

- 50% takes the rise over Q4 instead of Q3.
- 80% and 90% use wrong values.

Final Answer: increase $= 100\% \Rightarrow$ C

Answer: (C) Go Back to Q58

Q59.

Solution

Concept — Average of tabulated values: Average $= \dfrac{\text{total}}{\text{number of entries}}$.

Step 1 — Total: $40 + 50 + 30 + 60 = 180$ thousand.

Step 2 — Divide by 4: $\dfrac{180}{4} = 45$ thousand units.

Why other options are wrong:

- 40 and 50 are individual quarter values.
- 42 uses a wrong total.

Final Answer: average $= 45$ thousand units $\Rightarrow$ $\boxed{\text{B}}$

Answer: (B) Go Back to Q59

Q60.

Solution

Concept — Data sufficiency for a unique value: A statement is sufficient only if it pins N to a single value.

Step 1 — Statement I alone: Digit sum 9 allows $18, 27, 36, 45, 54, \ldots$ Many two-digit values, so not sufficient.

Step 2 — Statement II alone: Multiples of 45 below 50: only 45 qualifies ($45 < 50$, and $90 > 50$). This pins $N = 45$ uniquely. Sufficient alone.

Step 3 — Conclusion: Statement II alone is sufficient, Statement I alone is not.

Why other options are wrong:

- Statement I leaves several candidates, so options crediting it alone are wrong.
- "Both together" or "each alone" overstate Statement I's power.

Final Answer: Statement II alone is sufficient $\Rightarrow$ $\boxed{\text{D}}$

Answer: (D) Go Back to Q60

Answer Key

Q	Ans	Q	Ans	Q	Ans	Q	Ans	Q	Ans
1	B	2	C	3	A	4	D	5	B
6	A	7	C	8	D	9	B	10	A
11	C	12	D	13	A	14	B	15	C
16	D	17	B	18	A	19	C	20	B
21	D	22	A	23	C	24	B	25	D
26	A	27	C	28	B	29	D	30	A
31	C	32	A	33	B	34	D	35	A
36	C	37	B	38	D	39	A	40	C
41	B	42	A	43	C	44	D	45	B
46	A	47	D	48	C	49	B	50	A
51	D	52	B	53	A	54	C	55	B
56	D	57	A	58	C	59	B	60	D