

Kerala NMMS Mathematics

Sample Paper – 1

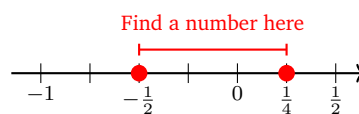
Duration: 30 Minutes

Maximum Marks: 30

Instructions

- This paper contains **30** Multiple Choice Questions (Single Correct Answer), modelled on the Mathematics portion of **Kerala NMMS (SAT)**.
- Each correct answer carries **+1 mark**. There is **no negative marking** for incorrect or unattempted answers.
- Only **one** option is correct. Choose carefully.
- Syllabus level: **Class 7–8 (SCERT Kerala) — Number System, Algebra, Mensuration, Geometry, Comparing Quantities, Ratio & Proportion, Data Handling, Exponents.**
- Use of mobile phones, calculators, or electronic gadgets is strictly prohibited. Rough work may be done in the space provided.

Q1. Which of the following rational numbers lies between $-\frac{1}{2}$ and $\frac{1}{4}$ on the number line?



- (A) 0
- (B) $-\frac{3}{4}$
- (C) $\frac{1}{2}$
- (D) -1

Q2. Simplify: $\left(\frac{3}{4} + \left(-\frac{5}{6}\right)\right) \times \frac{2}{3}$

- (A) $\frac{1}{18}$



(B) $-\frac{1}{18}$

(C) $-\frac{1}{12}$

(D) $\frac{1}{12}$

Q3. The additive inverse of $-\frac{7}{9}$ is:

(A) $-\frac{7}{9}$

(B) $\frac{9}{7}$

(C) $\frac{7}{9}$

(D) $-\frac{9}{7}$

Q4. Express $-\frac{45}{75}$ in standard form.

(A) $-\frac{9}{15}$

(B) $-\frac{1}{5}$

(C) $-\frac{5}{3}$

(D) $-\frac{3}{5}$

Q5. Using the identity $(a + b)^2 = a^2 + 2ab + b^2$, expand $(2x + 3y)^2$.

(A) $4x^2 + 12xy + 9y^2$

(B) $4x^2 + 6xy + 9y^2$

(C) $4x^2 - 12xy + 9y^2$

(D) $4x^2 + 9y^2$

Q6. Factorize $6x^2 + 9x$ by taking out the highest common factor.

(A) $3(2x^2 + 3x)$



(B) $3x(2x + 3)$

(C) $6x\left(x + \frac{3}{2}\right)$

(D) $x(6x + 9)$

Q7. Solve for x : $5x - 3 = 2x + 9$

(A) $x = 2$

(B) $x = 3$

(C) $x = 4$

(D) $x = 6$

Q8. A father is 4 times his son's age. In 6 years, the father will be 2.5 times as old as his son. What is the son's present age?

(A) 4 years

(B) 5 years

(C) 8 years

(D) 6 years

Q9. Simplify: $\frac{x^2 - 9}{x + 3}$ ($x \neq -3$)

(A) $x - 3$

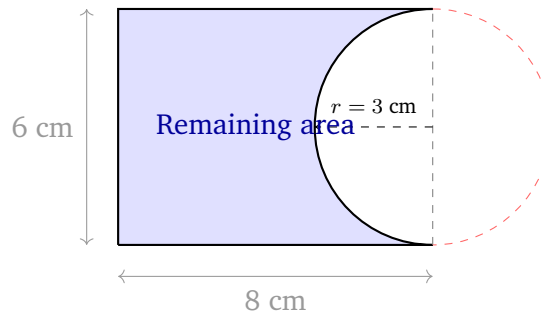
(B) $x + 3$

(C) $x^2 - 3$

(D) $x - 9$

Q10. A rectangle measures $8 \text{ cm} \times 6 \text{ cm}$. A semicircle of diameter 6 cm is cut away from one of its shorter ends. Find the remaining area. (Use $\pi = \frac{22}{7}$)



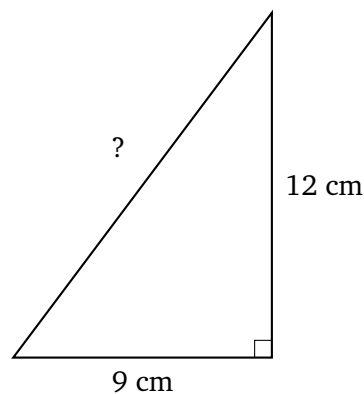


- (A) 33 cm^2
- (B) $\frac{237}{7} \text{ cm}^2$
- (C) 34 cm^2
- (D) $\frac{226}{7} \text{ cm}^2$

Q11. Find the volume of a cuboid with length 12 cm, breadth 5 cm, and height 7 cm.

- (A) 410 cm^3
- (B) 396 cm^3
- (C) 420 cm^3
- (D) 432 cm^3

Q12. Find the perimeter of the right-angled triangle shown below, with legs 9 cm and 12 cm.



- (A) 30 cm
- (B) 32 cm
- (C) 34 cm



(D) 36 cm

Q13. Find the total surface area of a cylinder with radius $r = 7$ cm and height $h = 10$ cm. (Use $\pi = \frac{22}{7}$)

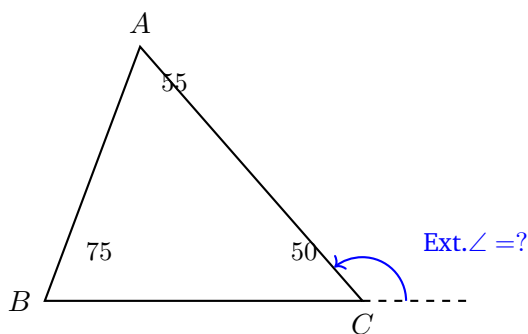
(A) 748 cm^2

(B) 660 cm^2

(C) 440 cm^2

(D) 704 cm^2

Q14. In triangle ABC , $\angle A = 55$ and $\angle B = 75$. What is the measure of the exterior angle at C ?



(A) 120

(B) 130

(C) 140

(D) 150

Q15. In a parallelogram $ABCD$, $\angle A = 110$. Find $\angle C$.

(A) 70

(B) 80

(C) 110

(D) 120

Q16. What is the sum of interior angles of a hexagon?



- (A) 540
- (B) 600
- (C) 660
- (D) 720

Q17. In triangles ABC and PQR : $AB = PQ$, $BC = QR$, and $\angle B = \angle Q$. The triangles are congruent by which criterion?

- (A) SAS
- (B) SSS
- (C) ASA
- (D) AAS

Q18. The price of a product increased from Rs. 500 to Rs. 650. Find the percentage increase.

- (A) 25%
- (B) 30%
- (C) 35%
- (D) 28%

Q19. A shopkeeper purchased an article for Rs. 840 and sold it for Rs. 924. Find the profit percent.

- (A) 8%
- (B) 9%
- (C) 10%
- (D) 12%

Q20. Find the simple interest on Rs. 6000 at 8% per annum for 3 years.

- (A) Rs. 1200
- (B) Rs. 1380



(C) Rs. 1400

(D) Rs. 1440

Q21. Find the compound interest on Rs. 5000 at 10% per annum for 2 years, compounded annually.

(A) Rs. 1050

(B) Rs. 1000

(C) Rs. 1100

(D) Rs. 1025

Q22. The marked price of a book is Rs. 750. A discount of 12% is offered. Find the selling price.

(A) Rs. 630

(B) Rs. 660

(C) Rs. 690

(D) Rs. 720

Q23. 8 workers can complete a task in 15 days. If 12 workers are employed for the same task, in how many days will they complete it?

(A) 12 days

(B) 15 days

(C) 10 days

(D) 8 days

Q24. A car travelling at 60 km/h covers a certain distance in 4 hours. How long will it take to cover the same distance at 80 km/h?

(A) 5 hours

(B) 4 hours

(C) 3.5 hours



(D) 3 hours

Q25. Two numbers are in the ratio 3 : 5. Their sum is 120. Find the larger number.

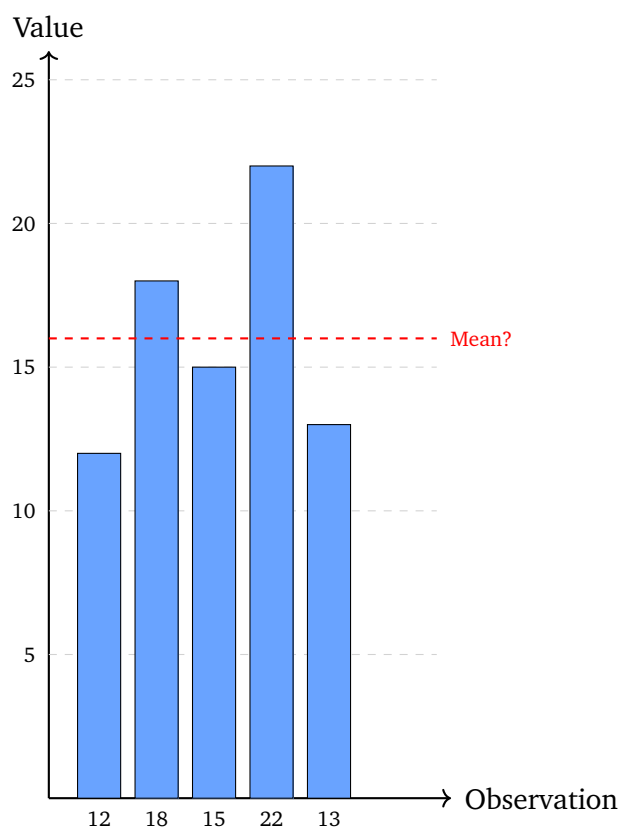
(A) 75

(B) 45

(C) 60

(D) 80

Q26. The bar chart below shows five data values: 12, 18, 15, 22, 13. Find their mean.



(A) 15

(B) 16

(C) 17

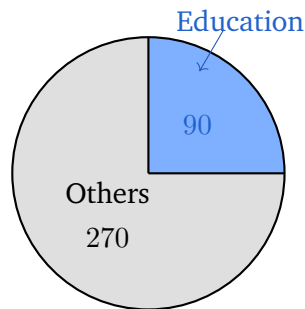
(D) 18



Q27. A bag contains 4 red, 5 blue, and 3 green balls. A ball is drawn at random. What is the probability that the ball drawn is blue?

- (A) $\frac{1}{4}$
- (B) $\frac{5}{9}$
- (C) $\frac{5}{12}$
- (D) $\frac{1}{3}$

Q28. In the pie chart below, the Education sector occupies a sector angle of 90. What percentage of the total does it represent?



- (A) 20%
- (B) 22.5%
- (C) 30%
- (D) 25%

Q29. Simplify: $\frac{2^3 \times 3^2}{2^2 \times 3}$

- (A) 6
- (B) 12
- (C) 3
- (D) 9

Q30. Express 0.000045 in scientific notation.

- (A) 4.5×10^{-4}



(B) 4.5×10^{-5}

(C) 45×10^{-6}

(D) 0.45×10^{-4}



Detailed Solutions

Q1.

Solution

Concept: A rational number x lies between a and b if $a < x < b$.

Step 1: We need a number x such that $-\frac{1}{2} < x < \frac{1}{4}$, i.e., $-0.5 < x < 0.25$.

Step 2: Check each option by converting to decimals:

- (A) $0 = 0.00$: Since $-0.5 < 0 < 0.25$, this lies between the two numbers. **Correct.**
- (B) $-\frac{3}{4} = -0.75$: Since $-0.75 < -0.5$, this lies to the left of $-\frac{1}{2}$. Not in range.
- (C) $\frac{1}{2} = 0.5$: Since $0.5 > 0.25$, this lies to the right of $\frac{1}{4}$. Not in range.
- (D) -1 : Since $-1 < -0.5$, this is far to the left. Not in range.

Why other options are wrong: Options (B) and (D) are smaller than $-\frac{1}{2}$, so they lie outside the left boundary. Option (C) is greater than $\frac{1}{4}$, so it lies outside the right boundary.

Answer: (A) [Go Back to Q1](#)

Q2.

Solution

Concept: Follow BODMAS — work out the bracket first, then multiply.

Step 1: Simplify inside the bracket.

$$\frac{3}{4} + \left(-\frac{5}{6}\right) = \frac{3}{4} - \frac{5}{6} = \frac{9}{12} - \frac{10}{12} = -\frac{1}{12}$$

Step 2: Multiply by $\frac{2}{3}$.

$$-\frac{1}{12} \times \frac{2}{3} = -\frac{2}{36} = -\frac{1}{18}$$

Why other options are wrong: Option (A) is positive $(+\frac{1}{18})$ — the sign is wrong because the bracket gives a negative result. Option (C) is $-\frac{1}{12}$, which is the bracket result before multiplying by $\frac{2}{3}$. Option (D) is $+\frac{1}{12}$, incorrect sign and



value.

Answer: (B) [Go Back to Q2](#)

Q3.

Solution

Concept: The **additive inverse** of a number a is $-a$, because $a + (-a) = 0$.

Step 1: The number given is $-\frac{7}{9}$.

Step 2: Its additive inverse is $-\left(-\frac{7}{9}\right) = \frac{7}{9}$.

Verification: $-\frac{7}{9} + \frac{7}{9} = 0$. **Confirmed.**

Why other options are wrong: Option (A) is the number itself. Option (B) $\frac{9}{7}$ is the multiplicative inverse (reciprocal), not the additive inverse. Option (D) $-\frac{9}{7}$ is neither.

Answer: (C) [Go Back to Q3](#)

Q4.

Solution

Concept: Standard form of a rational number requires that numerator and denominator have no common factor other than 1, and the denominator is positive.

Step 1: Find GCD of 45 and 75.

$$45 = 3^2 \times 5, \quad 75 = 3 \times 5^2 \quad \Rightarrow \quad \text{GCD} = 3 \times 5 = 15$$

Step 2: Divide both by 15.

$$-\frac{45}{75} = -\frac{45 \div 15}{75 \div 15} = -\frac{3}{5}$$

GCD(3, 5) = 1 and denominator is positive, so this is the standard form.

Why other options are wrong: Option (A) $-\frac{9}{15}$ is not fully reduced (GCD(9,15) = 3). Option (B) $-\frac{1}{5}$ is incorrect ($\frac{45}{75} \neq \frac{1}{5}$). Option (C) $-\frac{5}{3}$ inverts numerator and denominator.

Answer: (D) [Go Back to Q4](#)



Q5.

Solution**Concept:** Identity: $(a + b)^2 = a^2 + 2ab + b^2$.**Step 1:** Identify $a = 2x$ and $b = 3y$.**Step 2:** Substitute into the identity.

$$(2x + 3y)^2 = (2x)^2 + 2(2x)(3y) + (3y)^2 = 4x^2 + 12xy + 9y^2$$

Why other options are wrong: Option (B) has $6xy$ instead of $12xy$ — the coefficient $2ab = 2 \times 2x \times 3y = 12xy$, not $6xy$. Option (C) has a negative middle term, which would come from $(2x - 3y)^2$. Option (D) omits the middle term $2ab$ entirely.

Answer: (A) [Go Back to Q5](#)

Q6.

Solution**Concept:** To factorize by taking out the common factor, find the HCF of all terms and factor it out.**Step 1:** Terms are $6x^2$ and $9x$. HCF of coefficients: $\text{GCD}(6, 9) = 3$. HCF of variables: lowest power of x is x^1 .**HCF** = $3x$.**Step 2:** Factor out $3x$:

$$6x^2 + 9x = 3x \cdot 2x + 3x \cdot 3 = 3x(2x + 3)$$

Why other options are wrong: Option (A) $3(2x^2 + 3x)$ only takes out the numerical factor 3 but not x . Option (C) uses fractional coefficient inside the bracket. Option (D) only takes out x , not 3.

Answer: (B) [Go Back to Q6](#)

Q7.

Solution

Concept: Solve a linear equation by collecting variable terms on one side and constants on the other.

Step 1: Bring x -terms to the left and constants to the right.

$$5x - 2x = 9 + 3 \Rightarrow 3x = 12$$

Step 2: Divide both sides by 3.

$$x = \frac{12}{3} = 4$$

Verification: LHS = $5(4) - 3 = 17$; RHS = $2(4) + 9 = 17$. **Confirmed.**

Why other options are wrong: $x = 2$ gives LHS = 7, RHS = 13 (unequal). $x = 3$ gives LHS = 12, RHS = 15 (unequal). $x = 6$ gives LHS = 27, RHS = 21 (unequal).

Answer: (C) [Go Back to Q7](#)

Q8.

Solution

Concept: Translate the word problem into a linear equation using a variable for the unknown.

Step 1: Let son's present age = x years. Then father's present age = $4x$ years.

Step 2: After 6 years — son's age = $x + 6$, father's age = $4x + 6$.

Condition: $4x + 6 = 2.5(x + 6)$

$$4x + 6 = 2.5x + 15 \Rightarrow 1.5x = 9 \Rightarrow x = 6$$

Verification: Son = 6 yrs, Father = 24 yrs. After 6 years: Son = 12, Father = 30. Is $30 = 2.5 \times 12$? Yes. **Confirmed.**

Why other options are wrong: $x = 4 \Rightarrow$ Father = 16; after 6 years: son = 10, father = 22; $22 \neq 2.5 \times 10 = 25$. Similarly $x = 5$ and $x = 8$ fail the verification.

Answer: (D) [Go Back to Q8](#)



Q9.

Solution

Concept: Use the algebraic identity $a^2 - b^2 = (a + b)(a - b)$ to factorise the numerator.

Step 1: Factorise $x^2 - 9$.

$$x^2 - 9 = x^2 - 3^2 = (x + 3)(x - 3)$$

Step 2: Cancel the common factor $(x + 3)$ (valid when $x \neq -3$).

$$\frac{x^2 - 9}{x + 3} = \frac{(x + 3)(x - 3)}{x + 3} = x - 3$$

Why other options are wrong: Option (B) $x + 3$ would result if we cancelled $(x - 3)$, which is not a factor of the numerator here. Option (C) $x^2 - 3$ is not simplified at all. Option (D) $x - 9$ has a wrong constant.

Answer: (A) [Go Back to Q9](#)

Q10.

Solution

Concept: Remaining area = Area of rectangle – Area of semicircle.

Step 1: Area of rectangle = $l \times b = 8 \times 6 = 48 \text{ cm}^2$.

Step 2: The semicircle has diameter 6 cm, so radius $r = 3 \text{ cm}$.

$$\text{Area of semicircle} = \frac{1}{2}\pi r^2 = \frac{1}{2} \times \frac{22}{7} \times 3^2 = \frac{1}{2} \times \frac{22}{7} \times 9 = \frac{99}{7} \text{ cm}^2$$

Step 3: Remaining area:

$$48 - \frac{99}{7} = \frac{336}{7} - \frac{99}{7} = \frac{237}{7} \text{ cm}^2 \approx 33.86 \text{ cm}^2$$

Why other options are wrong: Option (A) 33 and Option (C) 34 are rounded approximations, not exact values. Option (D) $\frac{226}{7}$ uses an incorrect semicircle area.

Answer: (B) [Go Back to Q10](#)



Q11.

Solution**Concept:** Volume of a cuboid = $l \times b \times h$.**Step 1:** Substitute the values: $l = 12$ cm, $b = 5$ cm, $h = 7$ cm.

$$V = 12 \times 5 \times 7$$

Step 2: Calculate:

$$12 \times 5 = 60, \quad 60 \times 7 = 420 \text{ cm}^3$$

Why other options are wrong: Option (A) 410 and Option (B) 396 result from arithmetic errors. Option (D) 432 could come from using wrong dimensions (e.g., $8 \times 6 \times 9$).**Answer: (C)** [Go Back to Q11](#)

Q12.

Solution**Concept:** Use the Pythagorean theorem to find the hypotenuse, then add all three sides for the perimeter.**Step 1:** Find the hypotenuse h using Pythagoras' theorem.

$$h = \sqrt{9^2 + 12^2} = \sqrt{81 + 144} = \sqrt{225} = 15 \text{ cm}$$

Step 2: Perimeter = sum of all three sides.

$$P = 9 + 12 + 15 = 36 \text{ cm}$$

Why other options are wrong: If the hypotenuse is forgotten or miscalculated (e.g., $\sqrt{81 + 144} = 13$, wrong), the perimeter would be different. $9 + 12 + 13 = 34$ (Option C). Without hypotenuse: $9 + 12 = 21$. Options (A) 30 and (B) 32 arise from incorrect hypotenuse values.**Answer: (D)** [Go Back to Q12](#)

Q13.

Solution

Concept: Total Surface Area (TSA) of a cylinder = $2\pi r(r + h)$, which includes two circular faces and the curved surface.

Step 1: Substitute $r = 7$ cm, $h = 10$ cm, $\pi = \frac{22}{7}$.

$$\text{TSA} = 2\pi r(r + h) = 2 \times \frac{22}{7} \times 7 \times (7 + 10)$$

Step 2: Simplify step by step.

$$= 2 \times 22 \times 17 \quad (\text{since } \frac{22}{7} \times 7 = 22) = 44 \times 17 = 748 \text{ cm}^2$$

Why other options are wrong: Option (B) 660 uses $r + h = 15$ instead of 17. Option (C) 440 uses only the curved surface area ($2\pi rh = 2 \times 22 \times 10 = 440$), omitting the two circular caps. Option (D) 704 arises from a different arithmetic error.

Answer: (A) [Go Back to Q13](#)

Q14.

Solution

Concept: The **Exterior Angle Theorem** states: an exterior angle of a triangle equals the sum of the two non-adjacent (remote) interior angles.

Step 1: The remote interior angles are $\angle A = 55$ and $\angle B = 75$.

Step 2:

$$\text{Exterior angle at } C = \angle A + \angle B = 55 + 75 = 130$$

Alternative method: $\angle C = 180 - 55 - 75 = 50$ (angle sum). Exterior angle = $180 - 50 = 130$.

Why other options are wrong: Option (A) 120° would mean $\angle A + \angle B = 120$, but $55 + 75 = 130$. Options (C) 140° and (D) 150° arise from incorrectly adding or substituting angles.

Answer: (B) [Go Back to Q14](#)



Q15.

Solution

Concept: In a parallelogram, **opposite angles are equal** and adjacent angles are supplementary (sum = 180).

Step 1: In parallelogram $ABCD$, angle A and angle C are opposite angles.

Step 2: Therefore $\angle C = \angle A = 110$.

Cross-check: Adjacent angles: $\angle A + \angle B = 180$, so $\angle B = 70$. And $\angle D = \angle B = 70$.
Sum = $110 + 70 + 110 + 70 = 360$. **Confirmed.**

Why other options are wrong: Option (A) 70 is the adjacent angle $\angle B$ or $\angle D$, not opposite. Options (B) 80 and (D) 120 have no basis in parallelogram properties.

Answer: (C) [Go Back to Q15](#)

Q16.

Solution

Concept: Sum of interior angles of an n -sided polygon = $(n - 2) \times 180$.

Step 1: A hexagon has $n = 6$ sides.

Step 2:

$$\text{Sum} = (6 - 2) \times 180 = 4 \times 180 = 720$$

Why other options are wrong: Option (A) 540 is the sum for a pentagon ($n = 5$). Option (B) 600 has no standard polygon. Option (C) 660 corresponds to $n = 5.67$, which is not a polygon.

Answer: (D) [Go Back to Q16](#)

Q17.

Solution

Concept: Congruence criteria for triangles: SSS, SAS, ASA, AAS, RHS.

Step 1: Given: $AB = PQ$ (first side), $BC = QR$ (second side), $\angle B = \angle Q$ (included angle between the two sides).

Step 2: Two sides and the **included angle** (the angle between the two given sides) are equal. This is the **SAS (Side-Angle-Side)** criterion.

Why other options are wrong: SSS requires all three pairs of sides to be equal. ASA requires two angles and the included side. AAS requires two angles and a non-included side. Here only two sides and one angle are given, and the angle is included between the sides.



Answer: (A) [Go Back to Q17](#)

Q18.

Solution

Concept: Percentage increase = $\frac{\text{Increase}}{\text{Original Value}} \times 100$.

Step 1: Increase = $650 - 500 = 150$.

Step 2:

$$\text{Percentage increase} = \frac{150}{500} \times 100 = \frac{150 \times 100}{500} = \frac{15000}{500} = 30\%$$

Why other options are wrong: Option (A) $25\% = \frac{125}{500} \times 100$ corresponds to an increase of Rs. 125, not Rs. 150. Option (C) 35% corresponds to an increase of Rs. 175. Option (D) 28% gives an increase of Rs. 140.

Answer: (B) [Go Back to Q18](#)

Q19.

Solution

Concept: Profit% = $\frac{\text{Profit}}{\text{Cost Price}} \times 100$.

Step 1: Profit = SP – CP = $924 - 840 = \text{Rs. } 84$.

Step 2:

$$\text{Profit\%} = \frac{84}{840} \times 100 = \frac{8400}{840} = 10\%$$

Why other options are wrong: Option (A) 8% of Rs. 840 = Rs. 67.2 (not the actual profit). Option (B) 9% of Rs. 840 = Rs. 75.6. Option (D) 12% of Rs. 840 = Rs. 100.8.

Answer: (C) [Go Back to Q19](#)



Q20.

Solution

Concept: Simple Interest = $\frac{P \times R \times T}{100}$, where P = Principal, R = Rate%, T = Time (years).

Step 1: Given: $P = 6000$, $R = 8$, $T = 3$.

Step 2:

$$SI = \frac{6000 \times 8 \times 3}{100} = \frac{144000}{100} = \text{Rs. } 1440$$

Why other options are wrong: Option (A) Rs.1200 uses $T = 2.5$ years. Option (B) Rs.1380 is a calculation error. Option (C) Rs.1400 corresponds to $\frac{6000 \times 7 \times 10}{3 \times 100}$, a different set of values.

Answer: (D) [Go Back to Q20](#)

Q21.

Solution

Concept: Amount with compound interest: $A = P \left(1 + \frac{R}{100}\right)^T$. $CI = A - P$.

Step 1: $P = 5000$, $R = 10\%$, $T = 2$ years.

$$A = 5000 \times \left(1 + \frac{10}{100}\right)^2 = 5000 \times (1.1)^2 = 5000 \times 1.21 = 6050$$

Step 2:

$$CI = A - P = 6050 - 5000 = \text{Rs. } 1050$$

Why other options are wrong: Option (B) Rs. 1000 is simple interest for 2 years ($\frac{5000 \times 10 \times 2}{100} = 1000$). CI is always greater than SI because interest is compounded. Option (C) Rs. 1100 over-estimates. Option (D) Rs. 1025 corresponds to annual compounding for 1 year only.

Answer: (A) [Go Back to Q21](#)



Q22.

Solution**Concept:** Selling Price = Marked Price – Discount. Discount = Discount% $\times$ MP.**Step 1:** Discount = 12% of Rs. 750.

$$\text{Discount} = \frac{12}{100} \times 750 = \frac{9000}{100} = \text{Rs. } 90$$

Step 2: Selling Price = 750 – 90 = Rs. 660.**Alternative:** $SP = MP \times \left(1 - \frac{12}{100}\right) = 750 \times 0.88 = \text{Rs. } 660.$ **Why other options are wrong:** Option (A) Rs. 630 uses a 16% discount. Option (C) Rs. 690 uses an 8% discount. Option (D) Rs. 720 uses only 4% discount.**Answer:** (B) [Go Back to Q22](#)

Q23.

Solution**Concept:** Workers and days are **inversely proportional** — more workers, fewer days (total work remains constant).**Step 1:** Total work (in worker-days) = $8 \times 15 = 120$ worker-days.**Step 2:** With 12 workers, let days required = d .

$$12 \times d = 120 \Rightarrow d = \frac{120}{12} = 10 \text{ days}$$

Why other options are wrong: Option (A) 12 days: $12 \times 12 = 144 \neq 120$ worker-days. Option (B) 15 days is the original number of days with 8 workers. Option (D) 8 days: $12 \times 8 = 96 \neq 120$ worker-days.**Answer:** (C) [Go Back to Q23](#)

Q24.

Solution**Concept:** Speed and time are **inversely proportional** for the same distance: Speed $\times$ Time = Distance (constant).**Step 1:** Distance = $60 \times 4 = 240$ km.**Step 2:** At 80 km/h, time = $\frac{240}{80} = 3$ hours.

Using inverse proportion:

$$60 \times 4 = 80 \times t \Rightarrow t = \frac{240}{80} = 3 \text{ hours}$$

Why other options are wrong: Option (A) 5 hours would give distance = $80 \times 5 = 400$ km (not 240). Option (B) 4 hours is the original time at 60 km/h. Option (C) 3.5 hours gives $80 \times 3.5 = 280$ km (not 240).

Answer: (D) [Go Back to Q24](#)

Q25.

Solution

Concept: If two numbers are in ratio $m : n$, let them be mk and nk for some constant k .

Step 1: Let the numbers be $3k$ and $5k$.

$$3k + 5k = 120 \Rightarrow 8k = 120 \Rightarrow k = 15$$

Step 2: The numbers are $3k = 45$ and $5k = 75$. The larger number is 75.

Why other options are wrong: Option (B) 45 is the **smaller** number, not the larger. Option (C) 60 is neither of the numbers. Option (D) 80 would require $5k = 80 \Rightarrow k = 16$, giving $3k = 48$, and $48 + 80 = 128 \neq 120$.

Answer: (A) [Go Back to Q25](#)

Q26.

Solution

Concept: Mean = $\frac{\text{Sum of all observations}}{\text{Number of observations}}$.

Step 1: Sum of values = $12 + 18 + 15 + 22 + 13$.

$$12 + 18 = 30, \quad 30 + 15 = 45, \quad 45 + 22 = 67, \quad 67 + 13 = 80$$

Step 2: Number of observations = 5.

$$\text{Mean} = \frac{80}{5} = 16$$

The red dashed line on the bar chart at height 16 shows the mean.

Why other options are wrong: Option (A) 15 is the value of the middle obser-



vation (median if sorted: 12, 13, 15, 18, 22), not the mean. Option (C) 17 and Option (D) 18 are arithmetic errors in computing the sum or dividing.

Answer: (B) [Go Back to Q26](#)

Q27.

Solution

Concept: Probability of an event = $\frac{\text{Number of favourable outcomes}}{\text{Total number of outcomes}}$.

Step 1: Total balls = $4 + 5 + 3 = 12$.

Step 2: Number of blue balls = 5.

$$P(\text{blue}) = \frac{5}{12}$$

Why other options are wrong: Option (A) $\frac{1}{4} = \frac{3}{12}$ is the probability of drawing a **green** ball. Option (B) $\frac{5}{9}$ uses total as 9 (only red + green), ignoring all balls. Option (D) $\frac{1}{3} = \frac{4}{12}$ is the probability of drawing a **red** ball.

Answer: (C) [Go Back to Q27](#)

Q28.

Solution

Concept: In a pie chart, the full circle represents 100% and corresponds to 360° . Any sector's percentage = $\frac{\text{Sector angle}}{360} \times 100$.

Step 1: Education sector angle = 90° .

Step 2:

$$\text{Percentage} = \frac{90}{360} \times 100 = \frac{1}{4} \times 100 = 25\%$$

Why other options are wrong: Option (A) $20\% = \frac{72}{360} \times 100$ corresponds to a sector of 72° . Option (B) $22.5\% = \frac{81}{360} \times 100$ corresponds to 81° . Option (C) $30\% = \frac{108}{360} \times 100$ corresponds to 108° .

Answer: (D) [Go Back to Q28](#)



Q29.

Solution

Concept: Use the law of indices: $\frac{a^m}{a^n} = a^{m-n}$.

Step 1: Separate the powers of 2 and 3.

$$\frac{2^3 \times 3^2}{2^2 \times 3} = \frac{2^3}{2^2} \times \frac{3^2}{3^1}$$

Step 2: Apply the law of indices.

$$= 2^{3-2} \times 3^{2-1} = 2^1 \times 3^1 = 2 \times 3 = 6$$

Why other options are wrong: Option (B) 12 comes from 2×6 or 3×4 , a multiplication error. Option (C) 3 ignores the factor of 2. Option (D) 9 ignores the factor of 2 and uses 3^2 instead of 3^1 .

Answer: (A) [Go Back to Q29](#)

Q30.

Solution

Concept: Scientific notation expresses a number as $a \times 10^n$, where $1 \leq a < 10$ and n is an integer.

Step 1: Count the zeros after the decimal point in 0.000045:

$$0.000045 = 0.0 \underbrace{0004}_\text{4 zeros} 5$$

Move the decimal point 5 places to the right to get 4.5.

Step 2: Since we moved right 5 places, multiply by 10^{-5} :

$$0.000045 = 4.5 \times 10^{-5}$$

Why other options are wrong: Option (A) $4.5 \times 10^{-4} = 0.00045$ (only 4 decimal places). Option (C) 45×10^{-6} equals the same value but is **not standard** form since $45 \geq 10$. Option (D) 0.45×10^{-4} is also not standard form since $0.45 < 1$.

Answer: (B) [Go Back to Q30](#)



Answer Key

Q	Ans	Q	Ans	Q	Ans	Q	Ans	Q	Ans
1	A	2	B	3	C	4	D	5	A
6	B	7	C	8	D	9	A	10	B
11	C	12	D	13	A	14	B	15	C
16	D	17	A	18	B	19	C	20	D
21	A	22	B	23	C	24	D	25	A
26	B	27	C	28	D	29	A	30	B

