

SHRESHTA NETS Mathematics

Sample Paper – 3

Duration: 54 Minutes

Maximum Marks: 120

Instructions

- This paper contains **30** Multiple Choice Questions (Single Correct Answer), modelled on the Mathematics portion of **SHRESHTA NETS** entrance.
- Each correct answer carries **+4 marks**. There is **no negative marking** for incorrect or unattempted answers.
- Only **one** option is correct. Choose carefully.
- Syllabus level: **NCERT Class 8 Mathematics (Ganita Prakash, 2024 edition)** — **all 13 chapters**.
- Use of mobile phones, calculators, or electronic gadgets is strictly prohibited.

Q1. The additive inverse of $\frac{-5}{9}$ is:

- (A) $\frac{5}{9}$
(B) $\frac{-5}{9}$
(C) $\frac{9}{5}$
(D) $\frac{-9}{5}$

Q2. Which of the following rational numbers is the **greatest**?

- (A) $\frac{-1}{2}$
(B) $\frac{-3}{4}$
(C) $\frac{-5}{6}$



(D) $\frac{-1}{3}$

Q3. Solve for t : $7t - 3 = 4t + 9$.

(A) 2

(B) 3

(C) 12

(D) 4

Q4. Three consecutive even integers have a sum of 78. Find the **largest** of the three integers.

(A) 28

(B) 26

(C) 30

(D) 24

Q5. Solve for x : $\frac{x - 3}{4} = \frac{x + 1}{6}$.

(A) 7

(B) 11

(C) 13

(D) 9

Q6. Two adjacent angles of a parallelogram are in the ratio 2 : 7. Find the measure of the **larger** angle.

(A) 140°

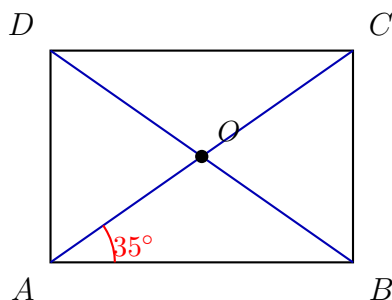
(B) 70°

(C) 40°

(D) 130°

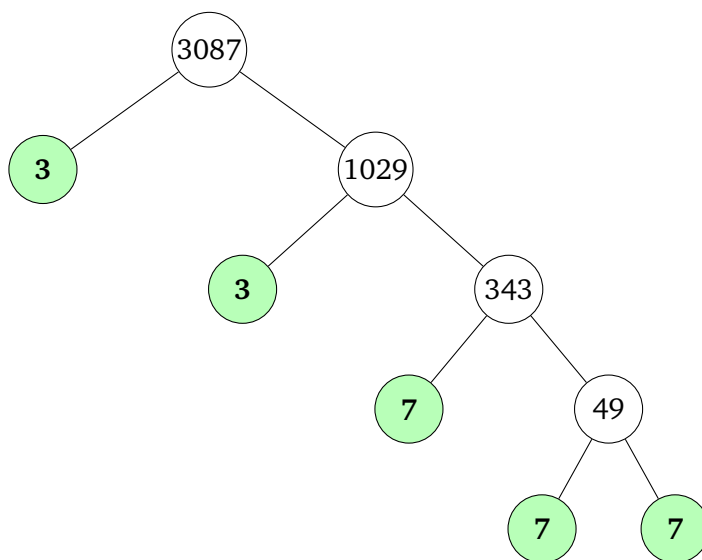


Q7. $ABCD$ is a rectangle. The diagonals AC and BD intersect at O . If $\angle OAB = 35^\circ$, find $\angle AOB$.



- (A) 70°
- (B) 55°
- (C) 90°
- (D) 110°

Q8. Find the **smallest** number by which 3087 must be multiplied to obtain a perfect square.



$$3087 = 3^2 \times 7^3 \Rightarrow \text{need one more factor of 7 to make every exponent even.}$$

- (A) 7
- (B) 3
- (C) 21
- (D) 49



Q9. Find $\sqrt{2916}$ using the long-division method.

- (A) 56
- (B) 48
- (C) 52
- (D) 54

Q10. Which of the following is **NOT** a Pythagorean triplet?

- (A) (9, 40, 41)
- (B) (12, 35, 38)
- (C) (11, 60, 61)
- (D) (15, 20, 25)

Q11. Which of the following is **NOT** a perfect cube?

- (A) 343
- (B) 512
- (C) 1000
- (D) 648

Q12. Find $\sqrt[3]{13824}$.

- (A) 24
- (B) 28
- (C) 22
- (D) 26

Q13. An article is sold for Rs 756 at a **loss of 10%**. Find the cost price.

- (A) Rs 756



- (B) Rs 900
- (C) Rs 780
- (D) Rs 840

Q14. Find the compound interest on Rs 10,000 at 5% per annum for 2 years, compounded annually.

- (A) Rs 1,025
- (B) Rs 1,000
- (C) Rs 1,050
- (D) Rs 1,500

Q15. A shopkeeper offers a discount of 15% on the MRP of Rs 1,200. Find the selling price.

- (A) Rs 1,080
- (B) Rs 1,020
- (C) Rs 1,200
- (D) Rs 960

Q16. Subtract $(2p^2 + 3q - r)$ from $(5p^2 - q + 4r)$.

- (A) $3p^2 + 4q + 5r$
- (B) $7p^2 - 4q + 3r$
- (C) $3p^2 - 4q + 5r$
- (D) $3p^2 + 4q - 5r$

Q17. Using the identity $(a + b)(a - b) = a^2 - b^2$, find the value of 101×99 .

- (A) 9,801

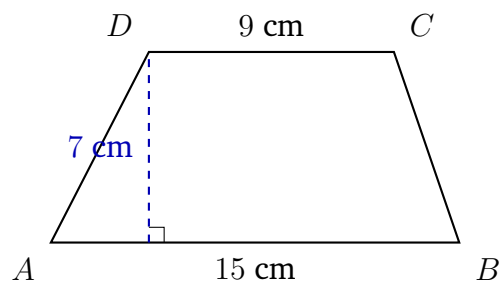


- (B) 10,001
- (C) 10,099
- (D) 9,999

Q18. Expand $(3p + 4q)^2$.

- (A) $9p^2 + 24pq + 16q^2$
- (B) $9p^2 + 16q^2$
- (C) $9p^2 - 24pq + 16q^2$
- (D) $9p^2 + 12pq + 16q^2$

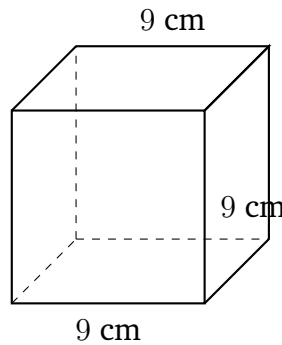
Q19. A trapezium has parallel sides of 9 cm and 15 cm, and a perpendicular height of 7 cm. Find its area.



- (A) 72 cm^2
- (B) 84 cm^2
- (C) 96 cm^2
- (D) 108 cm^2



Q20. Find the total surface area of a cube with edge length 9 cm.



- (A) 324 cm^2
- (B) 729 cm^2
- (C) 243 cm^2
- (D) 486 cm^2

Q21. Find the volume of a cylinder with base radius 7 cm and height 15 cm. $\left(\text{Use } \pi = \frac{22}{7}\right)$

- (A) $2,310 \text{ cm}^3$
- (B) $1,540 \text{ cm}^3$
- (C) $3,080 \text{ cm}^3$
- (D) $1,155 \text{ cm}^3$

Q22. Find the value of $\left(\frac{3}{2}\right)^{-2} \times \left(\frac{4}{3}\right)^2$.

- (A) $\frac{4}{9}$
- (B) $\frac{16}{9}$
- (C) $\frac{64}{81}$
- (D) 1

Q23. Express $(3.2 \times 10^5) \times (4.5 \times 10^3)$ in standard form.



- (A) 1.44×10^9
- (B) 14.4×10^8
- (C) 1.44×10^8
- (D) 14.4×10^9

Q24. 500 g of a substance costs Rs 75. Find the cost of 1.5 kg of the same substance (direct proportion).

- (A) Rs 150
- (B) Rs 180
- (C) Rs 200
- (D) Rs 225

Q25. A car travelling at 60 km/h takes 4 hours to complete a journey. How long will it take to cover the same distance at 80 km/h?

- (A) 2 hours
- (B) 3 hours
- (C) 5 hours
- (D) 4.5 hours

Q26. Factorise: $15x^2y^3 - 10x^3y^2 + 20xy^4$.

- (A) $5x^2y(3y^2 - 2xy + 4y^3)$
- (B) $5xy^2(3x - 2x^2 + 4y^2)$
- (C) $5xy^2(3xy - 2x^2 + 4y^2)$
- (D) $5x^2y^2(3y - 2x + 4y^2)$

Q27. Factorise: $25a^2 - 40ab + 16b^2$.



- (A) $(5a - 4b)^2$
 (B) $(5a + 4b)^2$
 (C) $(5a - 4b)(5a + 4b)$
 (D) $5(a - b)^2$

Q28. Divide $(6x^2 + 11x + 3)$ by $(3x + 1)$.

- (A) $2x - 3$
 (B) $3x + 2$
 (C) $2x + 1$
 (D) $2x + 3$

Q29. Two fair coins are tossed simultaneously. What is the probability of getting **at least one head**?

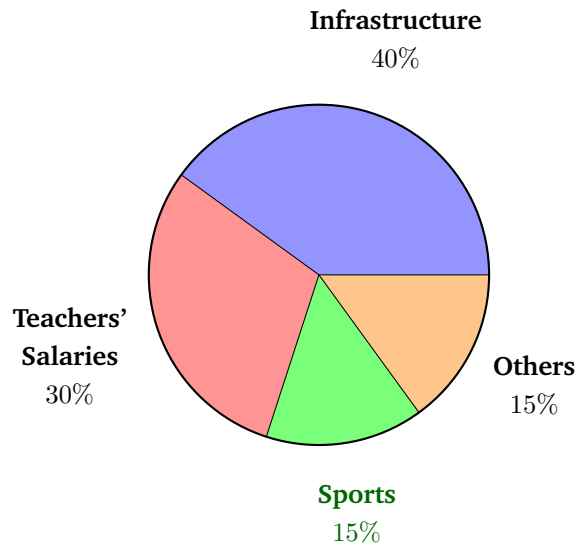
		Coin 2	
		H	T
Coin 1	H	HH	HT
	T	TH	TT

Shaded = favourable outcome (at least one H)

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



Q30. A school's annual budget is Rs 12,00,000. The pie chart below shows the percentage distribution. Find the amount spent on **Sports**.



- (A) Rs 4,80,000
- (B) Rs 3,60,000
- (C) Rs 1,20,000
- (D) Rs 1,80,000



Detailed Solutions

Solution

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

Step 1: Let the additive inverse of $\frac{-5}{9}$ be y .

$$\frac{-5}{9} + y = 0 \implies y = \frac{5}{9}.$$

Why others are wrong:

- Q1.
- (B) $\frac{-5}{9}$: This is the number itself, not its additive inverse.
 - (C) $\frac{9}{5}$: This is the multiplicative inverse of $\frac{5}{9}$, not the additive inverse.
 - (D) $\frac{-9}{5}$: The negative of the multiplicative inverse; unrelated.

Final Answer: $\boxed{\frac{5}{9}}$

Answer: (A)

Solution

Concept: Among negative rational numbers, the one with the smallest absolute value (closest to zero on the number line) is the greatest.

Step 1: Convert each to a decimal:

$$\frac{-1}{2} = -0.500, \quad \frac{-3}{4} = -0.750, \quad \frac{-5}{6} \approx -0.833, \quad \frac{-1}{3} \approx -0.333.$$

Step 2: Order: $-0.833 < -0.750 < -0.500 < -0.333$.

Hence $\frac{-1}{3}$ is the greatest (closest to 0).

Why others are wrong:

- Q2.
- (A) $\frac{-1}{2} = -0.5$: Less than $\frac{-1}{3} \approx -0.333$.
 - (B) $\frac{-3}{4} = -0.75$: Further from zero than $\frac{-1}{3}$.
 - (C) $\frac{-5}{6} \approx -0.833$: The smallest (most negative) of all four.

Final Answer: $\boxed{\frac{-1}{3}}$

Answer: (D)



Solution

Concept: Collect like terms on each side of a linear equation.

Step 1: $7t - 3 = 4t + 9$

$$\Rightarrow 7t - 4t = 9 + 3 \Rightarrow 3t = 12 \Rightarrow t = 4.$$

Verification: LHS = $7(4) - 3 = 25$; RHS = $4(4) + 9 = 25$. ✓

Why others are wrong:

- Q3.**
- (A) $t = 2$: LHS = $11 \neq 17$ = RHS.
 - (B) $t = 3$: LHS = $18 \neq 21$ = RHS.
 - (C) $t = 12$: LHS = $81 \neq 57$ = RHS.

Final Answer: $t = 4$

Answer: (D)

Solution

Concept: Represent consecutive even integers algebraically.

Step 1: Let the three consecutive even integers be $n, n + 2, n + 4$.

$$n + (n + 2) + (n + 4) = 78 \Rightarrow 3n + 6 = 78 \Rightarrow 3n = 72 \Rightarrow n = 24.$$

Step 2: The three integers are 24, 26, 28. The largest is 28.

Why others are wrong:

- Q4.**
- (B) 26: This is the middle integer.
 - (C) 30: Sum would be $26 + 28 + 30 = 84 \neq 78$.
 - (D) 24: This is the smallest integer, not the largest.

Final Answer: 28

Answer: (A)

Solution

Concept: Solve a fractional linear equation by cross-multiplication.

Step 1: $\frac{x-3}{4} = \frac{x+1}{6} \Rightarrow 6(x-3) = 4(x+1)$

$$6x - 18 = 4x + 4 \Rightarrow 2x = 22 \Rightarrow x = 11.$$

Verification: LHS = $\frac{11-3}{4} = \frac{8}{4} = 2$; RHS = $\frac{11+1}{6} = \frac{12}{6} = 2$. ✓

Why others are wrong:

- Q5.**
- (A) $x = 7$: LHS = $\frac{4}{4} = 1 \neq \frac{8}{6} \approx 1.33$.
 - (C) $x = 13$: LHS = $\frac{10}{4} = 2.5 \neq \frac{14}{6} \approx 2.33$.
 - (D) $x = 9$: LHS = $\frac{6}{4} = 1.5 \neq \frac{10}{6} \approx 1.67$.

Final Answer: $x = 11$



Answer: (B)

Solution**Concept:** Adjacent angles of a parallelogram are supplementary (sum = 180°).**Step 1:** Let the two adjacent angles be $2k$ and $7k$.

$$2k + 7k = 180^\circ \Rightarrow 9k = 180^\circ \Rightarrow k = 20^\circ.$$

Step 2: Larger angle = $7 \times 20^\circ = 140^\circ$. Smaller = $2 \times 20^\circ = 40^\circ$.**Why others are wrong:**

- Q6.**
- (B) 70° : Neither $2k = 40^\circ$ nor $7k = 140^\circ$ equals 70° .
 - (C) 40° : This is the *smaller* angle ($2k$), not the larger.
 - (D) 130° : For $k = 130/7 \approx 18.6^\circ$, the sum $2k + 7k = 9k \approx 167^\circ \neq 180^\circ$.

Final Answer: 140°

Answer: (A)

Solution**Concept:** Diagonals of a rectangle are equal in length and bisect each other, so $OA = OB$ (each equal to half the diagonal length).**Step 1:** In rectangle $ABCD$: diagonals $AC = BD$ and they bisect each other at O .

$$\therefore OA = OB = \frac{1}{2} AC.$$

Step 2: $\triangle AOB$ is isosceles with $OA = OB$.

$$\Rightarrow \angle OAB = \angle OBA = 35^\circ \text{ (base angles of isosceles triangle).}$$

Step 3: Angle sum in $\triangle AOB$:

$$\angle AOB = 180^\circ - 35^\circ - 35^\circ = 110^\circ.$$

Why others are wrong:

- Q7.**
- (A) 70° : $\angle OAB + \angle OBA$ would need to equal 110° , giving each $55^\circ \neq 35^\circ$.
 - (B) 55° : Incomplete calculation; $\angle AOB = 180^\circ - 2(35^\circ) = 110^\circ$, not 55° .
 - (C) 90° : Diagonals intersect at 90° only in a rhombus, not in a general rectangle.

Final Answer: 110°

Answer: (D)

Solution**Concept:** A perfect square requires every prime factor to appear an *even* number of times.**Step 1:** Prime factorisation of 3087:

$$3087 \div 3 = 1029; \quad 1029 \div 3 = 343 = 7^3.$$

$$\therefore 3087 = 3^2 \times 7^3.$$

Step 2: 3 appears twice (even) — fine. 7 appears three times (odd) — need **one more 7**.

Step 3: $3087 \times 7 = 21609 = 3^2 \times 7^4 = (3 \times 7^2)^2 = 147^2$. ✓

Why others are wrong:

- Q8.**
- (B) 3: Gives $3^3 \times 7^3$; *both* exponents become odd — still not a perfect square.
 - (C) 21 = 3 × 7: Gives $3^3 \times 7^4$; exponent of 3 is still odd.
 - (D) 49 = 7²: Gives $3^2 \times 7^5$; exponent of 7 becomes 5 (still odd).

Final Answer: 7

Answer: (A)

Solution

Concept: Square root by long division — group digits in pairs from right.

Step 1: Group 2916 as 29 | 16.

Step 2: Largest integer whose square ≤ 29 : take 5 ($5^2 = 25$). First quotient digit = 5; remainder = $29 - 25 = 4$.

Step 3: Bring down 16: new dividend = 416. Double quotient: $2 \times 5 = 10$. Find digit d such that $(100 + d) \times d \leq 416$. Try $d = 4$: $104 \times 4 = 416$. Remainder = 0. ✓

Result: $\sqrt{2916} = 54$. Verify: $54^2 = 2916$. ✓

Why others are wrong:

- Q9.**
- (A) $56^2 = 3136 \neq 2916$.
 - (B) $48^2 = 2304 \neq 2916$.
 - (C) $52^2 = 2704 \neq 2916$.

Final Answer: 54

Answer: (D)

Solution

Concept: (a, b, c) is a Pythagorean triplet iff $a^2 + b^2 = c^2$, where c is the largest.

Step 1: Check (12, 35, 38): $12^2 + 35^2 = 144 + 1225 = 1369$; $38^2 = 1444$. $1369 \neq 1444$. **NOT a triplet.**

Step 2 (verify others):

- Q10.**
- (9, 40, 41): $81 + 1600 = 1681 = 41^2$. ✓
 - (11, 60, 61): $121 + 3600 = 3721 = 61^2$. ✓



- $(15, 20, 25): 225 + 400 = 625 = 25^2$. ✓

Final Answer: (12, 35, 38)

Answer: (B)

Solution

Concept: A number is a perfect cube iff every prime in its factorisation appears a number of times that is a *multiple of 3*.

Step 1: Verify each option:

- Q11.**
- $343 = 7^3$. ✓
 - $512 = 2^9 = (2^3)^3$. ✓
 - $1000 = 2^3 \times 5^3 = (10)^3$. ✓
 - $648 = 8 \times 81 = 2^3 \times 3^4$. Here 3 appears **4 times**; 4 is not a multiple of 3. **NOT a perfect cube.**

Final Answer: 648

Answer: (D)

Solution

Concept: Find the cube root via prime factorisation or direct computation.

Step 1: Check 24^3 : $24 \times 24 = 576$; $576 \times 24 = 13824$. ✓

Step 2 (alternate): $13824 = 8 \times 1728 = 2^3 \times 12^3 = (2 \times 12)^3 = 24^3$.

$\therefore \sqrt[3]{13824} = 24$.

Why others are wrong:

- Q12.**
- (B) $28^3 = 21952 \neq 13824$.
 - (C) $22^3 = 10648 \neq 13824$.
 - (D) $26^3 = 17576 \neq 13824$.

Final Answer: 24

Answer: (A)

Solution

Concept: $SP = CP \times \left(1 - \frac{\text{loss}\%}{100}\right)$, so $CP = \frac{SP}{1 - \text{loss}\%/100}$.

Step 1: $756 = CP \times \frac{90}{100}$

Step 2: $CP = 756 \times \frac{100}{90} = 756 \times \frac{10}{9} = 84 \times 10 = \text{Rs } 840$.



Verification: 10% of $840 = 84$; $SP = 840 - 84 = 756$. ✓

Why others are wrong:

- Q13.**
- (A) Rs 756: That is the SP itself, not the CP.
 - (B) Rs 900: $900 \times 0.9 = 810 \neq 756$.
 - (C) Rs 780: $780 \times 0.9 = 702 \neq 756$.

Final Answer: Rs 840

Answer: (D)

Solution

Concept: $A = P\left(1 + \frac{r}{100}\right)^n$; $CI = A - P$.

Step 1: $A = 10000 \times \left(\frac{105}{100}\right)^2 = 10000 \times \frac{11025}{10000} = 11025$.

Step 2: $CI = 11025 - 10000 = \text{Rs } 1025$.

Why others are wrong:

- Q14.**
- (B) Rs 1000: This is the *simple* interest ($\frac{10000 \times 5 \times 2}{100} = 1000$), ignoring compounding.
 - (C) Rs 1050: Incorrect; would require effective rate of 5.25%.
 - (D) Rs 1500: Far too high for 5% over 2 years on Rs 10000.

Final Answer: Rs 1,025

Answer: (A)

Solution

Concept: $SP \text{ after discount} = MRP \times \left(1 - \frac{\text{discount}\%}{100}\right)$.

Step 1: $SP = 1200 \times \frac{85}{100} = 1200 \times 0.85 = \text{Rs } 1020$.

Alternatively: Discount = 15% of 1200 = 180; $SP = 1200 - 180 = 1020$.

Why others are wrong:

- Q15.**
- (A) Rs 1080: Corresponds to only a 10% discount ($1200 \times 0.9 = 1080$).
 - (C) Rs 1200: The MRP itself — no discount applied.
 - (D) Rs 960: Corresponds to a 20% discount ($1200 \times 0.8 = 960$).

Final Answer: Rs 1,020

Answer: (B)



Solution

Concept: To subtract, change the sign of every term in the subtrahend, then add.

Step 1: $(5p^2 - q + 4r) - (2p^2 + 3q - r) = 5p^2 - q + 4r - 2p^2 - 3q + r$

Step 2: Collect like terms:

$$p^2\text{-terms: } 5 - 2 = 3; \quad q\text{-terms: } -1 - 3 = -4; \quad r\text{-terms: } 4 + 1 = 5.$$

Result: $3p^2 - 4q + 5r$.

Why others are wrong:

- Q16.**
- (A) $3p^2 + 4q + 5r$: Sign of q -term is wrong (should be $-4q$, not $+4q$).
 - (B) $7p^2 - 4q + 3r$: p^2 terms were added ($5 + 2$) instead of subtracted ($5 - 2$).
 - (D) $3p^2 + 4q - 5r$: Both q and r signs are wrong.

Final Answer: $3p^2 - 4q + 5r$

Answer: (C)

Solution

Concept: $(a + b)(a - b) = a^2 - b^2$.

Step 1: Write $101 \times 99 = (100 + 1)(100 - 1)$.

Step 2: Apply the identity with $a = 100$, $b = 1$:

$$(100 + 1)(100 - 1) = 100^2 - 1^2 = 10000 - 1 = 9999.$$

Why others are wrong:

- Q17.**
- (A) $9801 = 99^2$: Square of 99, not the product 101×99 .
 - (B) 10001: Not a correct product. ($101 \times 99 = 9999$.)
 - (C) 10099: Error — perhaps computed $101 \times 100 - 1 = 10099$ instead of 101×99 .

Final Answer: 9,999

Answer: (D)

Solution

Concept: $(a + b)^2 = a^2 + 2ab + b^2$.

Step 1: Here $a = 3p$, $b = 4q$.

$$(3p + 4q)^2 = (3p)^2 + 2(3p)(4q) + (4q)^2 = 9p^2 + 24pq + 16q^2.$$



Why others are wrong:

- Q18.**
- (B) $9p^2 + 16q^2$: Missing the middle term $24pq$ (a common error — the “square of a sum” is not the sum of squares).
 - (C) $9p^2 - 24pq + 16q^2$: This equals $(3p - 4q)^2$, with wrong sign on the middle term.
 - (D) $9p^2 + 12pq + 16q^2$: Middle coefficient should be $2 \times 3 \times 4 = 24$, not 12.

Final Answer: $9p^2 + 24pq + 16q^2$

Answer: (A)

Solution

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

Step 1: Parallel sides = 9 cm and 15 cm; height = 7 cm.

$$\text{Area} = \frac{1}{2} \times (9 + 15) \times 7 = \frac{1}{2} \times 24 \times 7 = 12 \times 7 = 84 \text{ cm}^2.$$

Why others are wrong:

- Q19.**
- (A) 72 cm^2 : $\frac{1}{2} \times 24 \times 6 = 72$ — used height 6 instead of 7.
 - (C) 96 cm^2 : $\frac{1}{2} \times 24 \times 8 = 96$ — used height 8 instead of 7.
 - (D) 108 cm^2 : $\frac{1}{2} \times 24 \times 9 = 108$ — used height 9 instead of 7.

Final Answer: 84 cm^2

Answer: (B)

Solution

Concept: Total Surface Area (TSA) of a cube with edge $a = 6a^2$ (6 equal square faces).

Step 1: $a = 9 \text{ cm}$.

$$\text{TSA} = 6 \times 9^2 = 6 \times 81 = 486 \text{ cm}^2.$$

Why others are wrong:

- Q20.**
- (A) $324 \text{ cm}^2 = 4 \times 81$: Counts only 4 faces (lateral surface area), not all 6.
 - (B) $729 \text{ cm}^2 = 9^3$: This is the *volume* of the cube in cm^3 , not the TSA.
 - (C) $243 \text{ cm}^2 = 3 \times 81$: Uses $3a^2$; no standard geometric meaning.

Final Answer: 486 cm^2

Answer: (D)



Solution

Concept: Volume of a cylinder $= \pi r^2 h$.

Step 1: $r = 7$ cm, $h = 15$ cm, $\pi = \frac{22}{7}$.

$$V = \frac{22}{7} \times 7^2 \times 15 = \frac{22}{7} \times 49 \times 15 = 22 \times 7 \times 15 = 154 \times 15 = 2310 \text{ cm}^3.$$

Why others are wrong:

- Q21.**
- (B) 1540 cm^3 : Result if $h = 10$ is used ($22 \times 7 \times 10 = 1540$).
 - (C) 3080 cm^3 : Double the correct answer; possible error of using $r = 14$.
 - (D) $1155 \text{ cm}^3 = 2310/2$: Half the correct answer; possible error of using $h = 7.5$.

Final Answer: $2,310 \text{ cm}^3$

Answer: (A)

Solution

Concept: $\left(\frac{a}{b}\right)^{-n} = \left(\frac{b}{a}\right)^n$.

Step 1: $\left(\frac{3}{2}\right)^{-2} = \left(\frac{2}{3}\right)^2 = \frac{4}{9}$.

Step 2: $\left(\frac{4}{3}\right)^2 = \frac{16}{9}$.

Step 3: Product $= \frac{4}{9} \times \frac{16}{9} = \frac{64}{81}$.

Why others are wrong:

- Q22.**
- (A) $\frac{4}{9}$: Only the value of the first factor; forgot to multiply by $\left(\frac{4}{3}\right)^2$.
 - (B) $\frac{16}{9}$: Only the value of the second factor.
 - (D) 1: Incorrect; perhaps confused $\left(\frac{3}{2}\right)^{-2} \times \left(\frac{3}{2}\right)^2 = 1$ with a different expression.

Final Answer: $\frac{64}{81}$

Answer: (C)

Solution

Concept: Standard form: $m \times 10^n$ where $1 \leq m < 10$. Multiply by combining coefficients and adding exponents.

Step 1: $(3.2 \times 10^5) \times (4.5 \times 10^3) = (3.2 \times 4.5) \times 10^{5+3} = 14.4 \times 10^8$.



Step 2: Convert to standard form: $14.4 = 1.44 \times 10^1$.

$$\therefore 14.4 \times 10^8 = 1.44 \times 10^9.$$

Why others are wrong:

- Q23.**
- (B) 14.4×10^8 : Correct numerical value but *not* in standard form ($14.4 \notin [1, 10)$).
 - (C) 1.44×10^8 : Standard form coefficient is correct but the power is one less than it should be.
 - (D) 14.4×10^9 : Both the coefficient and power are wrong.

Final Answer: 1.44×10^9

Answer: (A)

Solution

Concept: In direct proportion, $\frac{\text{cost}_1}{\text{mass}_1} = \frac{\text{cost}_2}{\text{mass}_2}$.

Step 1: Convert $1.5 \text{ kg} = 1500 \text{ g}$.

Step 2: $\frac{75}{500} = \frac{\text{Cost}}{1500} \Rightarrow \text{Cost} = \frac{75 \times 1500}{500} = 75 \times 3 = \text{Rs } 225.$

Why others are wrong:

- Q24.**
- (A) Rs 150: $75 \times 2 = 150$ — cost for 1000 g, not 1500 g.
 - (B) Rs 180: $75 \times 2.4 = 180$ — incorrect multiplier.
 - (C) Rs 200: Incorrect; $\frac{75}{500} \times 1500 = 225$, not 200.

Final Answer: Rs 225

Answer: (D)

Solution

Concept: Speed and time are inversely proportional when distance is constant:

$$s_1 t_1 = s_2 t_2.$$

Step 1: Total distance = $60 \times 4 = 240 \text{ km}$.

Step 2: $60 \times 4 = 80 \times t_2 \Rightarrow t_2 = \frac{240}{80} = 3 \text{ hours}.$

Verification: At 80 km/h for 3 h: distance = $80 \times 3 = 240 \text{ km}$. ✓

Why others are wrong:

- Q25.**
- (A) 2 h: $80 \times 2 = 160 \text{ km} \neq 240 \text{ km}$.
 - (C) 5 h: Implies the car slowed down; speed increased from 60 to 80, so time must decrease.
 - (D) 4.5 h: $80 \times 4.5 = 360 \text{ km} \neq 240 \text{ km}$.

Final Answer: 3 hours



Answer: (B)

Solution**Concept:** Factorise by taking out the HCF of all terms.**Step 1:** Find HCF of coefficients: $\gcd(15, 10, 20) = 5$. x -powers: $\min(2, 3, 1) = 1$. y -powers: $\min(3, 2, 4) = 2$. $\therefore$ HCF = $5xy^2$.**Step 2:** Divide each term:

$$15x^2y^3 \div 5xy^2 = 3xy; \quad 10x^3y^2 \div 5xy^2 = 2x^2; \quad 20xy^4 \div 5xy^2 = 4y^2.$$

Step 3: $15x^2y^3 - 10x^3y^2 + 20xy^4 = 5xy^2(3xy - 2x^2 + 4y^2)$.**Why others are wrong (by expansion):**

- Q26.**
- (A) $5x^2y(3y^2 - 2xy + 4y^3)$: Last term = $5x^2y \cdot 4y^3 = 20x^2y^4 \neq 20xy^4$.
 - (B) $5xy^2(3x - 2x^2 + 4y^2)$: First term = $5xy^2 \cdot 3x = 15x^2y^2 \neq 15x^2y^3$.
 - (D) $5x^2y^2(3y - 2x + 4y^2)$: Last term = $5x^2y^2 \cdot 4y^2 = 20x^2y^4 \neq 20xy^4$.

Final Answer: $5xy^2(3xy - 2x^2 + 4y^2)$

Answer: (C)

Solution**Concept:** $a^2 - 2ab + b^2 = (a - b)^2$.**Step 1:** Recognise the pattern: $25a^2 = (5a)^2$, $16b^2 = (4b)^2$, middle term = $40ab = 2 \times 5a \times 4b$. ✓**Step 2:** $25a^2 - 40ab + 16b^2 = (5a)^2 - 2(5a)(4b) + (4b)^2 = (5a - 4b)^2$.**Why others are wrong:**

- Q27.**
- (B) $(5a + 4b)^2 = 25a^2 + 40ab + 16b^2$: Middle term has a + sign, not -.
 - (C) $(5a - 4b)(5a + 4b) = 25a^2 - 16b^2$: Difference of squares; the $40ab$ middle term is absent.
 - (D) $5(a - b)^2 = 5a^2 - 10ab + 5b^2$: Coefficients do not match ($5 \neq 25$ and $5 \neq 16$).

Final Answer: $(5a - 4b)^2$

Answer: (A)

Solution**Concept:** Divide a polynomial by a linear factor — use factorisation or long division.**Step 1 (factorisation):** Split the middle term:

$$6x^2 + 11x + 3 = 6x^2 + 9x + 2x + 3 = 3x(2x + 3) + 1(2x + 3) = (3x + 1)(2x + 3).$$

Step 2: $\frac{(3x + 1)(2x + 3)}{(3x + 1)} = 2x + 3.$

Verification: $(3x + 1)(2x + 3) = 6x^2 + 9x + 2x + 3 = 6x^2 + 11x + 3. \checkmark$

Why others are wrong:

- Q28.**
- (A) $2x - 3$: $(3x + 1)(2x - 3) = 6x^2 - 7x - 3 \neq 6x^2 + 11x + 3.$
 - (B) $3x + 2$: $(3x + 1)(3x + 2) = 9x^2 + 9x + 2 \neq 6x^2 + 11x + 3.$
 - (C) $2x + 1$: $(3x + 1)(2x + 1) = 6x^2 + 5x + 1 \neq 6x^2 + 11x + 3.$

Final Answer: $2x + 3$

Answer: (D)

Solution

Concept: $P(\text{event}) = \frac{\text{No. of favourable outcomes}}{\text{Total no. of outcomes}}.$

Step 1: Sample space when two coins are tossed: $S = \{HH, HT, TH, TT\}.$
 $|S| = 4.$

Step 2: Event E (at least one head) = $\{HH, HT, TH\}.$ $|E| = 3.$

Step 3: $P(E) = \frac{3}{4}.$

Why others are wrong:

- Q29.**
- (A) $\frac{1}{2}$: Probability of *exactly* one head, or of a *single* coin landing heads.
 - (C) $\frac{1}{4}$: Probability of *no* head, i.e., $P(TT) = \frac{1}{4}.$
 - (D) 1: Would be certain; but outcome TT has no head, so at-least-one-head is not certain.

Final Answer: $\frac{3}{4}$

Answer: (B)

Solution

Concept: Amount for a sector = $\frac{\text{sector percentage}}{100} \times \text{Total budget}.$

Step 1: Sports sector = 15% of total budget.

Step 2:

$$\text{Sports amount} = \frac{15}{100} \times 12,00,000 = 15 \times 12,000 = \text{Rs } 1,80,000.$$

Why others are wrong:



- Q30.**
- (A) Rs 4,80,000: This is 40% of the total — the Infrastructure allocation.
 - (B) Rs 3,60,000: This is 30% of the total — the Teachers' Salaries allocation.
 - (C) Rs 1,20,000: This is 10% of the total; no sector has 10%.

Final Answer: Rs 1,80,000

Answer: (D)



Answer Key

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

