

SHRESHTA NETS Mathematics

Sample Paper – 10

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.

Mathematics — Questions

Q1. Arrange the rational numbers $-\frac{3}{4}$, $\frac{1}{2}$, $-\frac{1}{3}$, $\frac{2}{5}$ in **ascending order**.

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

Q2. Find the **multiplicative inverse** of $\left(-\frac{5}{8}\right) \times \left(\frac{16}{25}\right)$.

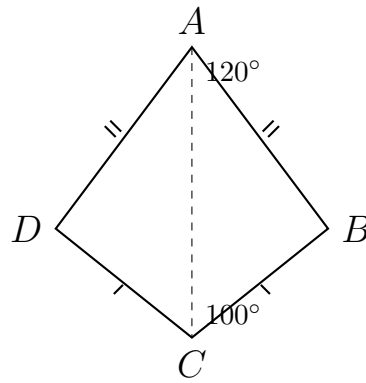
- (A) $-\frac{2}{5}$
(B) $-\frac{5}{2}$



- (C) $\frac{5}{2}$
(D) $\frac{2}{5}$

- Q3.** The angles of a triangle are x° , $(x + 20)^\circ$, and $(x + 40)^\circ$. Find the value of x .
- (A) 30°
(B) 50°
(C) 40°
(D) 60°
- Q4.** Pipe A can fill a tank in 6 hours and Pipe B can fill the same tank in 4 hours. If both pipes are opened together, how long will it take to fill the tank?
- (A) 5 hours
(B) 3 hours
(C) 2 hours
(D) 2 hours 24 minutes
- Q5.** Two numbers are in the ratio 3 : 5 and their sum is 56. Find the **larger** number.
- (A) 35
(B) 21
(C) 28
(D) 42
- Q6.** In the kite $ABCD$ shown below, $AB = AD$ and $CB = CD$. Given that $\angle A = 120^\circ$ and $\angle C = 100^\circ$, find the measure of $\angle B$ (which equals $\angle D$).





- (A) 60°
- (B) 70°
- (C) 80°
- (D) 90°

Q7. One angle of a cyclic quadrilateral is 110° . What is the measure of the **opposite** angle?

- (A) 110°
- (B) 90°
- (C) 70°
- (D) 80°

Q8. Find $\sqrt{625}$ using **prime factorisation**.

- (A) 20
- (B) 24
- (C) 30
- (D) 25

Q9. Using the number pattern $(n5)^2 = n \times (n + 1)$ hundred +25, find the value of 65^2 .

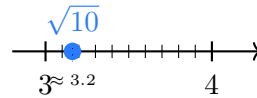
- (A) 4225
- (B) 4025



(C) 3625

(D) 4625

- Q10.** The number line below shows that $\sqrt{10}$ lies between 3 and 4. Which of the following is the **best approximation** of $\sqrt{10}$ correct to one decimal place?



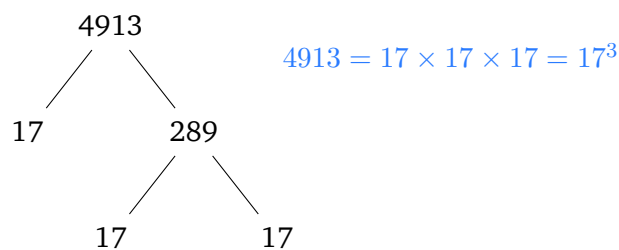
(A) 3.1

(B) 3.2

(C) 3.5

(D) 3.0

- Q11.** Is 4913 a perfect cube? The factor tree below may help. If yes, find its cube root.



(A) No, 4913 is not a perfect cube.

(B) Yes, $\sqrt[3]{4913} = 13$ (C) Yes, $\sqrt[3]{4913} = 17$ (D) Yes, $\sqrt[3]{4913} = 19$

- Q12.** Find $\sqrt[3]{\frac{27}{125}}$.

(A) $\frac{27}{125}$ (B) $\frac{9}{25}$ 

- (C) $\frac{3}{25}$
(D) $\frac{3}{5}$

Q13. An article is sold for Rs 1620 at a **profit of 8%**. Find its cost price.

- (A) Rs 1500
(B) Rs 1400
(C) Rs 1620
(D) Rs 1700

Q14. Successive discounts of 20% and 10% are given on a shirt marked at Rs 5000. Find the **selling price**.

- (A) Rs 3500
(B) Rs 3600
(C) Rs 3000
(D) Rs 3750

Q15. Find the amount when Principal = Rs 8000, Rate = 10% p.a. compounded annually, Time = 3 years.

- (A) Rs 10,000
(B) Rs 10,400
(C) Rs 10,648
(D) Rs 11,000

Q16. Simplify: $(3x - 4y)^2 - (3x + 4y)^2$.

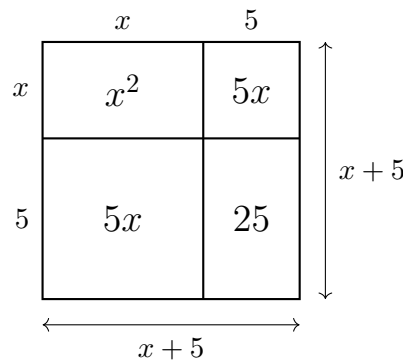
- (A) $48xy$
(B) $32x^2y$
(C) 0
(D) $-48xy$



Q17. If $a + b = 9$ and $ab = 18$, find the value of $a^2 + b^2$.

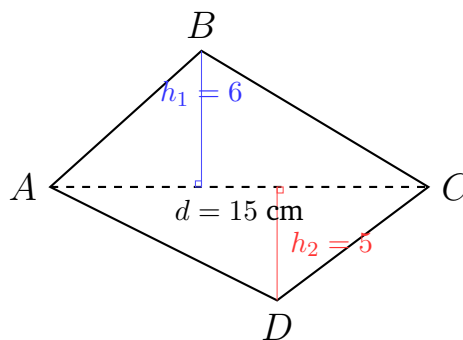
- (A) 45
- (B) 81
- (C) 27
- (D) 63

Q18. The area model below represents $(x + 5)^2$. What is the **expanded form**?



- (A) $x^2 + 5x + 25$
- (B) $x^2 + 10x + 25$
- (C) $x^2 + 25$
- (D) $x^2 + 10x + 10$

Q19. In the quadrilateral $ABCD$ shown below, diagonal $AC = 15$ cm. The perpendicular distance from B to AC is $h_1 = 6$ cm and from D to AC is $h_2 = 5$ cm. Find the **area of quadrilateral $ABCD$** .



- (A) 90 cm^2



- (B) 75 cm^2
- (C) 82.5 cm^2
- (D) 165 cm^2

Q20. The volume of a cube is 1331 cm^3 . Find its **total surface area**.

- (A) 484 cm^2
- (B) 121 cm^2
- (C) 600 cm^2
- (D) 726 cm^2

Q21. A cylindrical bucket has radius 14 cm and height 10 cm. Find its capacity in litres. (Use $\pi = \frac{22}{7}$)

- (A) 6.16 litres
- (B) 4.4 litres
- (C) 8.8 litres
- (D) 3.08 litres

Q22. Express 7.53×10^{-4} as a **decimal number**.

- (A) 0.00753
- (B) 0.000753
- (C) 0.0000753
- (D) 7530

Q23. Simplify: $(a^2b^3)^3 \div (a^3b^2)^2$.

- (A) a^3b
- (B) a^5b
- (C) b^5
- (D) ab^5



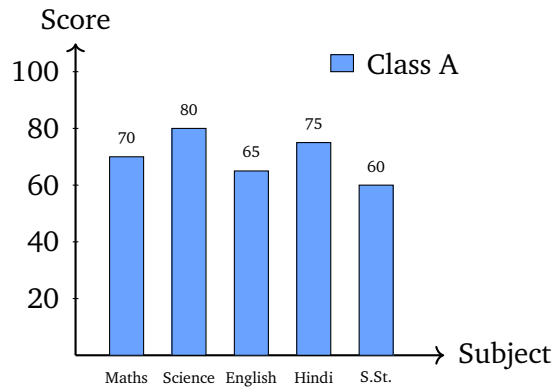
- Q24.** A pole 6 m tall casts a shadow 4 m long at a certain time of day. At the same time, what is the height of a tree that casts a shadow 10 m long?
- (A) 12 m
(B) 18 m
(C) 10 m
(D) 15 m
- Q25.** 15 workers can complete a road in 8 days. How many workers are needed to complete the **same road in 6 days**?
- (A) 20
(B) 18
(C) 24
(D) 12
- Q26.** Factorise: $12x^2y - 18xy^2 + 24x^2y^2$.
- (A) $6x(2xy - 3y^2 + 4xy^2)$
(B) $6xy(2x - 3y + 4xy)$
(C) $12xy(x - y + 2xy)$
(D) $6y(2x^2 - 3xy + 4x^2y)$
- Q27.** Factorise: $2x^2 + 7x + 6$.
- (A) $(2x + 1)(x + 6)$
(B) $(x + 3)(2x + 2)$
(C) $(2x + 3)(x + 2)$
(D) $(2x + 6)(x + 1)$
- Q28.** Divide $(4x^3 + 2x^2 - 6x)$ by $2x$.
- (A) $2x^2 - x + 3$
(B) $4x^2 + 2x - 6$



(C) $2x^2 + x$

(D) $2x^2 + x - 3$

Q29. The bar graph shows Class A's scores in five subjects. Find the **mean score** of Class A.



(A) 70

(B) 65

(C) 75

(D) 68

Q30. From the set $\{2, 4, 6, 8, 10, 12\}$, a number is chosen at random. Find the **probability** that it is a **multiple of 4**.

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

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

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

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



Detailed Solutions

Q1.

Solution

Concept — Rational Numbers: Ordering on the Number Line

Step 1 — Convert each fraction to a decimal:

$$\frac{-3}{4} = -0.75, \quad \frac{1}{2} = 0.5, \quad \frac{-1}{3} \approx -0.333, \quad \frac{2}{5} = 0.4$$

Step 2 — Arrange in ascending order (smallest to largest):

$$-0.75 < -0.333 < 0.4 < 0.5 \implies \frac{-3}{4} < \frac{-1}{3} < \frac{2}{5} < \frac{1}{2}$$

Why other options are wrong:

- Option (B): Places $-\frac{1}{3}$ before $-\frac{3}{4}$, which reverses the two negatives.
- Option (C): This is descending order, not ascending.
- Option (D): Places $\frac{2}{5}$ before $-\frac{1}{3}$, which is incorrect ($0.4 > -0.333$).

Final Answer: $\frac{-3}{4}, \frac{-1}{3}, \frac{2}{5}, \frac{1}{2} \Rightarrow \boxed{A}$ Answer: (A) [Go Back to Q1](#)

Q2.

Solution

Concept — Rational Numbers: Multiplicative Inverse

Step 1 — Compute the product:

$$\frac{-5}{8} \times \frac{16}{25} = \frac{-5 \times 16}{8 \times 25} = \frac{-80}{200} = \frac{-2}{5}$$

Step 2 — Find the multiplicative inverse:

The multiplicative inverse of $\frac{-2}{5}$ is $\frac{-5}{2}$, since $\frac{-2}{5} \times \frac{-5}{2} = 1$.

Why other options are wrong:

- Option (A): $-\frac{2}{5}$ is the product itself, not its inverse.
- Option (C): $\frac{5}{2}$ is positive; the inverse of a negative number is negative.



- Option (D): $\frac{2}{5}$ is the absolute inverse but with wrong sign.

Final Answer: Multiplicative inverse = $\frac{-5}{2} \Rightarrow \boxed{B}$

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

Q3.

Solution

Concept — Linear Equations in One Variable: Angle Sum of Triangle

Step 1 — Apply the angle sum property:

$$x + (x + 20) + (x + 40) = 180$$

$$3x + 60 = 180$$

Step 2 — Solve for x :

$$3x = 120 \implies x = 40^\circ$$

The three angles are 40° , 60° , 80° . Check: $40 + 60 + 80 = 180^\circ$. ✓

Why other options are wrong:

- Option (A): $x = 30^\circ$ gives sum $30 + 50 + 70 = 150 \neq 180$.
- Option (B): $x = 50^\circ$ gives sum $50 + 70 + 90 = 210 \neq 180$.
- Option (D): $x = 60^\circ$ gives sum $60 + 80 + 100 = 240 \neq 180$.

Final Answer: $x = 40^\circ \Rightarrow \boxed{C}$

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

Q4.

Solution

Concept — Linear Equations in One Variable: Work and Time (Pipe Filling)

Step 1 — Find the combined rate:

$$\text{Rate of A} = \frac{1}{6} \text{ tank/hr, Rate of B} = \frac{1}{4} \text{ tank/hr}$$

$$\text{Combined rate} = \frac{1}{6} + \frac{1}{4} = \frac{2}{12} + \frac{3}{12} = \frac{5}{12} \text{ tank/hr}$$



Step 2 — Find the time:

$$\text{Time} = \frac{1}{\frac{5}{12}} = \frac{12}{5} = 2.4 \text{ hours} = 2 \text{ hours } 24 \text{ minutes}$$

Why other options are wrong:

- Option (A): 5 hours ignores the combined effect; that would be even slower than Pipe B alone.
- Option (B): 3 hours is incorrect arithmetic of the combined rate.
- Option (C): 2 hours corresponds to $\frac{1}{2}$ tank/hr rate, which is too fast.

Final Answer: Time = 2 hours 24 minutes $\Rightarrow$ D

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

Q5.

Solution

Concept — Linear Equations in One Variable: Ratio and Sum

Step 1 — Set up the equation using the ratio:

Let the two numbers be $3k$ and $5k$.

$$3k + 5k = 56 \implies 8k = 56 \implies k = 7$$

Step 2 — Find the larger number:

$$\text{Larger number} = 5k = 5 \times 7 = 35$$

Check: Smaller = $3 \times 7 = 21$; sum = $21 + 35 = 56$. ✓

Why other options are wrong:

- Option (B): 21 is the *smaller* number, not the larger.
- Option (C): 28 does not fit either part of the ratio.
- Option (D): 42 would require $k = \frac{42}{5}$, which is not an integer; sum would exceed 56.

Final Answer: The larger number is 35 $\Rightarrow$ A

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



Q6.

Solution**Concept — Understanding Quadrilaterals: Angle Sum in a Kite****Step 1 — Recall the angle sum property of a quadrilateral:**

$$\angle A + \angle B + \angle C + \angle D = 360^\circ$$

Step 2 — Use the kite property $\angle B = \angle D$:

$$120^\circ + \angle B + 100^\circ + \angle D = 360^\circ$$

$$\angle B + \angle D = 360^\circ - 220^\circ = 140^\circ$$

Since $\angle B = \angle D$ in a kite:

$$2\angle B = 140^\circ \implies \angle B = 70^\circ$$

Why other options are wrong:

- Option (A): 60° would give total $120 + 60 + 100 + 60 = 340 \neq 360$.
- Option (C): 80° would give total $120 + 80 + 100 + 80 = 380 \neq 360$.
- Option (D): 90° would give total $120 + 90 + 100 + 90 = 400 \neq 360$.

Final Answer: $\angle B = \angle D = 70^\circ \Rightarrow \boxed{B}$ **Answer: (B)** [Go Back to Q6](#)

Q7.

Solution**Concept — Understanding Quadrilaterals: Cyclic Quadrilateral****Step 1 — State the key theorem:**In a cyclic quadrilateral, **opposite angles are supplementary** (they add up to 180°).**Step 2 — Find the opposite angle:**

$$\angle_{\text{opposite}} = 180^\circ - 110^\circ = 70^\circ$$

Why other options are wrong:

- Option (A): 110° would be correct only if opposite angles were equal (which is true for rectangles, not all cyclic quadrilaterals).
- Option (B): 90° applies only if one angle is 90° itself.
- Option (D): 80° corresponds to a non-existent pairing; $110 + 80 = 190 \neq 180$.

Final Answer: Opposite angle = $70^\circ \Rightarrow \boxed{C}$

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

Q8.

Solution

Concept — Squares and Square Roots: Prime Factorisation Method

Step 1 — Prime factorise 625:

$$625 = 5 \times 125 = 5 \times 5 \times 25 = 5 \times 5 \times 5 \times 5 = 5^4$$

Step 2 — Find the square root:

$$\sqrt{625} = \sqrt{5^4} = 5^2 = 25$$

Why other options are wrong:

- Option (A): $20^2 = 400 \neq 625$.
- Option (B): $24^2 = 576 \neq 625$.
- Option (C): $30^2 = 900 \neq 625$.

Final Answer: $\sqrt{625} = 25 \Rightarrow \boxed{D}$

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

Q9.

Solution

Concept — Squares and Square Roots: Number Pattern for Squares Ending in 5

Step 1 — Identify the pattern:

For any number ending in 5, say $n5$: $(n5)^2 = n \times (n + 1)$ hundred + 25.

For 65: here $n = 6$, so $n + 1 = 7$.



Step 2 — Apply the pattern:

$$65^2 = 6 \times 7 \text{ hundred} + 25 = 42 \times 100 + 25 = 4200 + 25 = 4225$$

Why other options are wrong:

- Option (B): 4025 corresponds to using $n = 6$, $n + 1 = 6$ (repeating n , not $n + 1$).
- Option (C): 3625 corresponds to $55^2 = 5 \times 6 \times 100 + 25 = 3025$; incorrect base.
- Option (D): 4625 is not a perfect square of any integer near 65.

Final Answer: $65^2 = 4225 \Rightarrow \boxed{A}$

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

Q10.

Solution

Concept — Squares and Square Roots: Estimating Square Roots by Squaring

Step 1 — Check that $\sqrt{10}$ lies between 3 and 4:

$$3^2 = 9 < 10 < 16 = 4^2 \quad \checkmark$$

Step 2 — Narrow down to one decimal place:

$$3.1^2 = 9.61 < 10 \quad \text{and} \quad 3.2^2 = 10.24 > 10$$

Since 10 is closer to $3.2^2 = 10.24$ than to $3.1^2 = 9.61$ (gap of 0.24 vs. 0.39), the best one-decimal approximation is **3.2**.

Why other options are wrong:

- Option (A): 3.1 — $3.1^2 = 9.61$, which underestimates 10 by 0.39.
- Option (C): 3.5 — $3.5^2 = 12.25$, far above 10.
- Option (D): 3.0 — $3.0^2 = 9.00$, too small; error of 1.

Final Answer: $\sqrt{10} \approx 3.2 \Rightarrow \boxed{B}$

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



Q11.

Solution**Concept — Cubes and Cube Roots: Prime Factorisation to Check Perfect Cube****Step 1 — Prime factorise 4913 using the factor tree:**

$$4913 = 17 \times 289 = 17 \times 17 \times 17 = 17^3$$

Step 2 — Conclude:

Since all prime factors appear in groups of three, 4913 is a perfect cube.

$$\sqrt[3]{4913} = \sqrt[3]{17^3} = 17$$

Why other options are wrong:

- Option (A): Incorrect; $17^3 = 4913$ confirms it is a perfect cube.
- Option (B): $13^3 = 2197 \neq 4913$.
- Option (D): $19^3 = 6859 \neq 4913$.

Final Answer: Yes, $\sqrt[3]{4913} = 17 \Rightarrow \boxed{C}$ **Answer: (C)** [Go Back to Q11](#)

Q12.

Solution**Concept — Cubes and Cube Roots: Cube Root of a Fraction****Step 1 — Apply the rule $\sqrt[3]{\frac{a}{b}} = \frac{\sqrt[3]{a}}{\sqrt[3]{b}}$:**

$$\sqrt[3]{\frac{27}{125}} = \frac{\sqrt[3]{27}}{\sqrt[3]{125}}$$

Step 2 — Evaluate each cube root:

$$\sqrt[3]{27} = 3 \quad (3^3 = 27), \quad \sqrt[3]{125} = 5 \quad (5^3 = 125)$$

$$\therefore \sqrt[3]{\frac{27}{125}} = \frac{3}{5}$$

Why other options are wrong:

- Option (A): $\frac{27}{125}$ is the original fraction, not the cube root.
- Option (B): $\frac{9}{25}$ arises from taking square roots instead of cube roots.
- Option (C): $\frac{3}{25}$ has the correct numerator but wrong denominator; $\sqrt[3]{125} = 5$, not 25.

Final Answer: $\sqrt[3]{\frac{27}{125}} = \frac{3}{5} \Rightarrow \boxed{D}$

Answer: (D) [Go Back to Q12](#)

Q13.

Solution

Concept — Comparing Quantities: Finding Cost Price from Selling Price and Profit %

Step 1 — Recall the formula:

$$SP = CP \times \left(1 + \frac{\text{Profit}\%}{100}\right)$$

Step 2 — Substitute and solve:

$$1620 = CP \times 1.08 \implies CP = \frac{1620}{1.08} = 1500$$

Check: Profit = $1620 - 1500 = 120$; $\frac{120}{1500} \times 100 = 8\%$. ✓

Why other options are wrong:

- Option (B): Rs 1400 gives profit = $\frac{220}{1400} \approx 15.7\% \neq 8\%$.
- Option (C): Rs 1620 would mean zero profit.
- Option (D): Rs 1700 gives a loss, not profit.

Final Answer: Cost Price = Rs 1500 $\Rightarrow \boxed{A}$

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



Q14.

Solution**Concept — Comparing Quantities: Successive Discounts****Step 1 — Apply the first discount of 20%:**

$$\text{Price after first discount} = 5000 \times \left(1 - \frac{20}{100}\right) = 5000 \times 0.80 = \text{Rs } 4000$$

Step 2 — Apply the second discount of 10%:

$$\text{Selling Price} = 4000 \times \left(1 - \frac{10}{100}\right) = 4000 \times 0.90 = \text{Rs } 3600$$

Why other options are wrong:

- Option (A): Rs 3500 arises from applying a combined 30% discount directly ($5000 \times 0.70 = 3500$), but successive discounts $\neq$ simple addition of percentages.
- Option (C): Rs 3000 overstates the total discount.
- Option (D): Rs 3750 corresponds to a single 25% discount.

Final Answer: Selling Price = Rs 3600 $\Rightarrow$ **B****Answer: (B)** [Go Back to Q14](#)

Q15.

Solution**Concept — Comparing Quantities: Compound Interest Formula****Step 1 — Recall the compound interest formula:**

$$A = P \left(1 + \frac{r}{100}\right)^n$$

Step 2 — Substitute $P = 8000$, $r = 10$, $n = 3$:

$$A = 8000 \times \left(1 + \frac{10}{100}\right)^3 = 8000 \times (1.1)^3$$

$$(1.1)^3 = 1.1 \times 1.1 \times 1.1 = 1.21 \times 1.1 = 1.331$$

$$A = 8000 \times 1.331 = \text{Rs } 10,648$$



Why other options are wrong:

- Option (A): Rs 10,000 = 8000×1.25 ; uses an incorrect multiplier.
- Option (B): Rs 10,400 corresponds to simple interest = $8000 + 8000 \times 0.10 \times 3$.
- Option (D): Rs 11,000 overstates the result.

Final Answer: $A = \text{Rs } 10,648 \Rightarrow \boxed{C}$

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

Q16.

Solution

Concept — Algebraic Expressions and Identities: Difference of Squares

Step 1 — Expand each square using $(a \pm b)^2 = a^2 \pm 2ab + b^2$:

$$(3x - 4y)^2 = 9x^2 - 24xy + 16y^2$$

$$(3x + 4y)^2 = 9x^2 + 24xy + 16y^2$$

Step 2 — Subtract:

$$(9x^2 - 24xy + 16y^2) - (9x^2 + 24xy + 16y^2) = -48xy$$

Alternatively, use $(A - B)^2 - (A + B)^2 = -4AB$ with $A = 3x$, $B = 4y$: $-4 \times 3x \times 4y = -48xy$.

Why other options are wrong:

- Option (A): $48xy$ has wrong sign; the result is negative.
- Option (B): $32x^2y$ is dimensionally wrong (cubic, not quadratic).
- Option (C): 0 would result only if both expressions were identical.

Final Answer: $(3x - 4y)^2 - (3x + 4y)^2 = -48xy \Rightarrow \boxed{D}$

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



Q17.

Solution**Concept — Algebraic Expressions and Identities: Using $(a + b)^2 = a^2 + 2ab + b^2$** **Step 1 — Write the identity and rearrange:**

$$(a + b)^2 = a^2 + 2ab + b^2 \implies a^2 + b^2 = (a + b)^2 - 2ab$$

Step 2 — Substitute the given values:

$$a^2 + b^2 = (9)^2 - 2(18) = 81 - 36 = 45$$

Why other options are wrong:

- Option (B): $81 = (a + b)^2$, which ignores subtracting $2ab$.
- Option (C): $27 = ab + \frac{ab}{2}$; no standard algebraic meaning here.
- Option (D): $63 = (a + b)^2 - 2ab - (-18)$; incorrect arithmetic.

Final Answer: $a^2 + b^2 = 45 \Rightarrow \boxed{A}$ **Answer: (A)** [Go Back to Q17](#)

Q18.

Solution**Concept — Algebraic Expressions and Identities: Area Model for $(x + 5)^2$** **Step 1 — Read the four regions from the area model:**The square with side $(x + 5)$ is divided into four rectangles:

- Top-left: $x \times x = x^2$
- Top-right: $x \times 5 = 5x$
- Bottom-left: $5 \times x = 5x$
- Bottom-right: $5 \times 5 = 25$

Step 2 — Sum all regions:

$$(x + 5)^2 = x^2 + 5x + 5x + 25 = x^2 + 10x + 25$$

Why other options are wrong:

- Option (A): $x^2 + 5x + 25$ counts only one rectangle of $5x$ instead of two.



- Option (C): $x^2 + 25$ omits the two $5x$ rectangles entirely.
- Option (D): $x^2 + 10x + 10$ uses 10 instead of 25 for the corner square.

Final Answer: $(x + 5)^2 = x^2 + 10x + 25 \Rightarrow \boxed{B}$

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

Q19.

Solution

Concept — Mensuration: Area of a Quadrilateral Using a Diagonal

Step 1 — Recall the formula:

$$\text{Area of quadrilateral} = \frac{1}{2} \times d \times (h_1 + h_2)$$

where d is the diagonal and h_1, h_2 are the perpendicular distances from the opposite vertices to the diagonal.

Step 2 — Substitute $d = 15, h_1 = 6, h_2 = 5$:

$$\text{Area} = \frac{1}{2} \times 15 \times (6 + 5) = \frac{1}{2} \times 15 \times 11 = \frac{165}{2} = 82.5 \text{ cm}^2$$

Why other options are wrong:

- Option (A): 90 cm^2 uses $h_1 + h_2 = 12$ (wrong sum).
- Option (B): 75 cm^2 uses $h_1 + h_2 = 10$ instead of 11.
- Option (D): 165 cm^2 omits the $\frac{1}{2}$ factor.

Final Answer: Area = $82.5 \text{ cm}^2 \Rightarrow \boxed{C}$

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

Q20.

Solution

Concept — Mensuration: Cube — Volume to Total Surface Area

Step 1 — Find the side length from the volume:

$$\text{Volume} = a^3 = 1331 \Rightarrow a = \sqrt[3]{1331}$$

$$11^3 = 1331 \Rightarrow a = 11 \text{ cm}$$



Step 2 — Compute the Total Surface Area (TSA):

$$\text{TSA} = 6a^2 = 6 \times 11^2 = 6 \times 121 = 726 \text{ cm}^2$$

Why other options are wrong:

- Option (A): $484 \text{ cm}^2 = 4 \times 121$; counts only 4 faces.
- Option (B): $121 \text{ cm}^2 = 1 \times 11^2$; counts only 1 face.
- Option (C): 600 cm^2 ; no standard derivation from side 11.

Final Answer: $\text{TSA} = 726 \text{ cm}^2 \Rightarrow \boxed{D}$

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

Q21.

Solution

Concept — Mensuration: Volume of a Cylinder

Step 1 — Apply the formula $V = \pi r^2 h$:

$$\begin{aligned} V &= \frac{22}{7} \times 14^2 \times 10 = \frac{22}{7} \times 196 \times 10 \\ &= \frac{22 \times 196 \times 10}{7} = \frac{43120}{7} = 6160 \text{ cm}^3 \end{aligned}$$

Step 2 — Convert to litres (1 litre = 1000 cm^3):

$$6160 \text{ cm}^3 = \frac{6160}{1000} \text{ litres} = 6.16 \text{ litres}$$

Why other options are wrong:

- Option (B): 4.4 litres uses $r = 7$ (half the given radius) instead of $r = 14$.
- Option (C): 8.8 litres uses $r^2 = 2 \times 14^2$ (doubled); calculation error.
- Option (D): 3.08 litres uses $h = 5$ instead of $h = 10$.

Final Answer: Capacity = 6.16 litres $\Rightarrow \boxed{A}$

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



Q22.

Solution**Concept — Exponents and Powers: Standard Form to Decimal (Negative Exponent)****Step 1 — Recall that** $10^{-4} = \frac{1}{10000}$:

$$7.53 \times 10^{-4} = \frac{7.53}{10000}$$

Step 2 — Move the decimal point 4 places to the left:

$$7.53 \rightarrow 0.000753$$

Why other options are wrong:

- Option (A): 0.00753 moves the decimal only 3 places left ($\times 10^{-3}$).
- Option (C): 0.0000753 moves the decimal 5 places left ($\times 10^{-5}$).
- Option (D): 7530 multiplies instead of divides ($\times 10^3$, wrong direction).

Final Answer: $7.53 \times 10^{-4} = 0.000753 \Rightarrow \boxed{B}$ **Answer: (B)** [Go Back to Q22](#)

Q23.

Solution**Concept — Exponents and Powers: Laws of Exponents****Step 1 — Simplify the numerator** $(a^2b^3)^3$:

$$(a^2b^3)^3 = a^{2 \times 3} \cdot b^{3 \times 3} = a^6b^9$$

Step 2 — Simplify the denominator $(a^3b^2)^2$:

$$(a^3b^2)^2 = a^{3 \times 2} \cdot b^{2 \times 2} = a^6b^4$$

Step 3 — Divide:

$$\frac{a^6b^9}{a^6b^4} = a^{6-6} \cdot b^{9-4} = a^0 \cdot b^5 = b^5$$

Why other options are wrong:

- Option (A): a^3b results from subtracting exponents incorrectly (using $2 - 3$ and $3 - 2$).
- Option (B): a^5b is a random wrong combination.
- Option (D): ab^5 introduces a spurious factor of a .

Final Answer: $(a^2b^3)^3 \div (a^3b^2)^2 = b^5 \Rightarrow \boxed{C}$

Answer: (C) [Go Back to Q23](#)

Q24.

Solution

Concept — Direct and Inverse Proportions: Direct Proportion (Shadow and Height)

Step 1 — Identify the direct proportion:

Height and shadow length are in direct proportion (same angle of sun).

$$\frac{\text{Height}_1}{\text{Shadow}_1} = \frac{\text{Height}_2}{\text{Shadow}_2}$$

Step 2 — Substitute and solve:

$$\frac{6}{4} = \frac{h}{10} \implies h = \frac{6 \times 10}{4} = \frac{60}{4} = 15 \text{ m}$$

Why other options are wrong:

- Option (A): 12 m uses $h = 6 + (10 - 4) = 12$; incorrect additive approach.
- Option (B): 18 m uses $h = 6 \times \frac{10}{4+1}$; no valid formula.
- Option (C): 10 m assumes height equals shadow length.

Final Answer: Height of tree = 15 m $\Rightarrow \boxed{D}$

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



Q25.

Solution

Concept — Direct and Inverse Proportions: Inverse Proportion (Workers and Days)

Step 1 — Set up inverse proportion:

More workers $\Rightarrow$ fewer days. Workers $\times$ Days = constant.

$$15 \times 8 = w \times 6$$

Step 2 — Solve for w :

$$w = \frac{15 \times 8}{6} = \frac{120}{6} = 20 \text{ workers}$$

Why other options are wrong:

- Option (B): 18 workers would take $\frac{120}{18} \approx 6.67$ days, not 6.
- Option (C): 24 workers would take $\frac{120}{24} = 5$ days, not 6.
- Option (D): 12 workers would take $\frac{120}{12} = 10$ days, not 6.

Final Answer: 20 workers are needed $\Rightarrow$ A

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

Q26.

Solution

Concept — Factorisation: Highest Common Factor Method

Step 1 — Find the HCF of the coefficients and variables:

$$12x^2y - 18xy^2 + 24x^2y^2$$

Coefficients: $\text{HCF}(12, 18, 24) = 6$. Variables: $\text{HCF}(x^2y, xy^2, x^2y^2) = xy$.

So $\text{HCF} = 6xy$.

Step 2 — Factor out $6xy$:

$$= 6xy \left(\frac{12x^2y}{6xy} - \frac{18xy^2}{6xy} + \frac{24x^2y^2}{6xy} \right) = 6xy(2x - 3y + 4xy)$$

Why other options are wrong:



- Option (A): $6x(2xy - 3y^2 + 4xy^2)$ — factor $6x$ misses the y from the HCF; inner terms are also incorrect.
- Option (C): $12xy(x - y + 2xy)$ — coefficient 12 is too large; $12xy \cdot x = 12x^2y$ but original coefficient is 12 only for first term.
- Option (D): $6y(2x^2 - 3xy + 4x^2y)$ — factor $6y$ misses the x from the HCF.

Final Answer: $12x^2y - 18xy^2 + 24x^2y^2 = 6xy(2x - 3y + 4xy) \Rightarrow \boxed{B}$

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

Q27.

Solution

Concept — Factorisation: Factorising a Quadratic Trinomial (Splitting the Middle Term)

Step 1 — Identify a , b , c and find two numbers whose product = ac and sum = b :

$$2x^2 + 7x + 6 \Rightarrow a = 2, b = 7, c = 6$$

$$ac = 2 \times 6 = 12; \text{ find pairs summing to 7: } 3 + 4 = 7 \quad \checkmark$$

Step 2 — Split the middle term and group:

$$2x^2 + 3x + 4x + 6 = x(2x + 3) + 2(2x + 3) = (2x + 3)(x + 2)$$

$$\text{Verify: } (2x + 3)(x + 2) = 2x^2 + 4x + 3x + 6 = 2x^2 + 7x + 6. \quad \checkmark$$

Why other options are wrong:

- Option (A): $(2x + 1)(x + 6) = 2x^2 + 13x + 6$; middle term is 13, not 7.
- Option (B): $(x + 3)(2x + 2) = 2x^2 + 8x + 6$; middle term is 8, not 7.
- Option (D): $(2x + 6)(x + 1) = 2x^2 + 8x + 6$; same error as (B).

Final Answer: $2x^2 + 7x + 6 = (2x + 3)(x + 2) \Rightarrow \boxed{C}$

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



Q28.

Solution**Concept — Factorisation: Division of a Polynomial by a Monomial****Step 1 — Divide each term of the numerator by $2x$:**

$$\frac{4x^3 + 2x^2 - 6x}{2x} = \frac{4x^3}{2x} + \frac{2x^2}{2x} - \frac{6x}{2x}$$

Step 2 — Simplify each term:

$$= 2x^2 + x - 3$$

Verify: $2x(2x^2 + x - 3) = 4x^3 + 2x^2 - 6x$. ✓**Why other options are wrong:**

- Option (A): $2x^2 - x + 3$ has wrong signs on the last two terms.
- Option (B): $4x^2 + 2x - 6$ divides by 1 instead of $2x$ (only cancels x , not the 2).
- Option (C): $2x^2 + x$ omits the constant term -3 (the $-6x \div 2x = -3$ step is missed).

Final Answer: $(4x^3 + 2x^2 - 6x) \div 2x = 2x^2 + x - 3 \Rightarrow \boxed{D}$ **Answer: (D)** [Go Back to Q28](#)

Q29.

Solution**Concept — Data Handling: Mean from a Bar Graph****Step 1 — Read Class A's scores from the bar graph:**

Subject	Score
Mathematics	70
Science	80
English	65
Hindi	75
Social Studies	60
Total	350



Step 2 — Calculate the mean:

$$\text{Mean} = \frac{70 + 80 + 65 + 75 + 60}{5} = \frac{350}{5} = 70$$

Why other options are wrong:

- Option (B): 65 is the score in English alone, not the mean.
- Option (C): 75 is the score in Hindi alone.
- Option (D): 68 would require total = 340; the actual total is 350.

Final Answer: Mean score of Class A = 70 $\Rightarrow$ A

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

Q30.

Solution

Concept — Data Handling: Probability — Multiples of 4

Step 1 — List the sample space and favourable outcomes:

Sample space $S = \{2, 4, 6, 8, 10, 12\}$; total outcomes = 6.

Multiples of 4 in S : $\{4, 8, 12\}$; favourable outcomes = 3.

Step 2 — Calculate the probability:

$$P(\text{multiple of 4}) = \frac{\text{Favourable outcomes}}{\text{Total outcomes}} = \frac{3}{6} = \frac{1}{2}$$

Why other options are wrong:

- Option (A): $\frac{1}{3}$ corresponds to 2 favourable out of 6 (e.g., multiples of 6: $\{6, 12\}$).
- Option (C): $\frac{2}{3}$ corresponds to 4 favourable outcomes out of 6.
- Option (D): $\frac{1}{6}$ corresponds to exactly 1 favourable outcome.

Final Answer: $P(\text{multiple of 4}) = \frac{1}{2} \Rightarrow$ B

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

