

SHRESHTA NETS Mathematics

Sample Paper – 1

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. Which of the following rational numbers is **NOT** between $-\frac{1}{2}$ and 0?

- (A) $-\frac{3}{4}$
(B) $-\frac{1}{4}$
(C) $-\frac{1}{8}$
(D) $-\frac{2}{5}$

Q2. Arrange the rational numbers $-\frac{2}{3}$, $\frac{3}{5}$, $-\frac{1}{4}$, $\frac{7}{10}$ in **ascending order**.

- (A) $\frac{3}{5} < \frac{7}{10} < -\frac{1}{4} < -\frac{2}{3}$
(B) $-\frac{1}{4} < -\frac{2}{3} < \frac{3}{5} < \frac{7}{10}$



(C) $-\frac{2}{3} < -\frac{1}{4} < \frac{3}{5} < \frac{7}{10}$

(D) $-\frac{2}{3} < \frac{3}{5} < -\frac{1}{4} < \frac{7}{10}$

Q3. Solve for x : $3x - 7 = 2x + 9$

(A) 2

(B) 7

(C) 14

(D) 16

Q4. A number exceeds another number by 7. Their sum is 43. Find the **larger** number.

(A) 18

(B) 25

(C) 28

(D) 32

Q5. Solve for x : $\frac{x}{2} + \frac{x}{3} = 10$

(A) 12

(B) 8

(C) 15

(D) 10

Q6. Three angles of a quadrilateral measure 65, 85, and 135. Find the **fourth** angle.

(A) 65

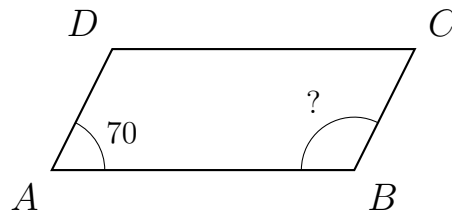
(B) 85

(C) 75

(D) 95



Q7. In the parallelogram $ABCD$ shown below, $\angle A = 70$. Find $\angle B$.



- (A) 70
- (B) 110
- (C) 120
- (D) 90

Q8. The prime factorisation of 720 is illustrated below. What is the **smallest positive integer** by which 720 must be multiplied to make it a **perfect square**?

$$720 = 2^4 \times 3^2 \times 5^1$$

Paired: $2^4, 3^2$ Unpaired: 5^1
Multiply by 5 $\Rightarrow 720 \times 5 = 3600 = 60^2$

- (A) 2
- (B) 3
- (C) 4
- (D) 5

Q9. Find $\sqrt{1764}$ using the long division method.

- (A) 42
- (B) 44
- (C) 46
- (D) 48

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



- (A) (5, 12, 13)
- (B) (8, 15, 17)
- (C) (7, 8, 9)
- (D) (20, 21, 29)

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

- (A) 216
- (B) 288
- (C) 343
- (D) 512

Q12. Find $\sqrt[3]{10648}$.

- (A) 18
- (B) 20
- (C) 21
- (D) 22

Q13. A shopkeeper buys an article for **Rs 600** and sells it at a **25% profit**. Find the selling price.

- (A) Rs 700
- (B) Rs 750
- (C) Rs 800
- (D) Rs 900

Q14. Find the **compound interest** on Rs 5000 at **10% per annum** for **2 years**, compounded annually.

- (A) Rs 900
- (B) Rs 1000
- (C) Rs 1050



(D) Rs 1100

Q15. A shopkeeper offers a **20% discount** on the MRP of Rs 1500. Find the **selling price**.

(A) Rs 1200

(B) Rs 1300

(C) Rs 1400

(D) Rs 1250

Q16. Subtract $(3x^2 - 2xy + y^2)$ from $(5x^2 + 4xy - 3y^2)$.

(A) $2x^2 - 6xy + 4y^2$

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

(C) $8x^2 + 2xy - 4y^2$

(D) $2x^2 + 6xy - 4y^2$

Q17. Using the identity $(a - b)^2 = a^2 - 2ab + b^2$, find the value of $(97)^2$.

(A) 9300

(B) 9409

(C) 9421

(D) 9500

Q18. Expand: $(3x + 4)(3x - 4)$

(A) $9x^2 + 24x - 16$

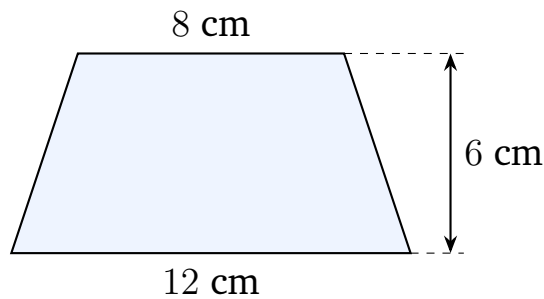
(B) $6x^2 - 16$

(C) $9x^2 - 16$

(D) $9x^2 + 16$

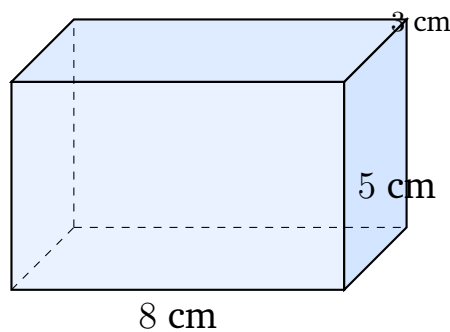
Q19. Find the **area** of the trapezium shown below, with parallel sides 12 cm and 8 cm, and height 6 cm.





- (A) 90 cm^2
- (B) 80 cm^2
- (C) 72 cm^2
- (D) 60 cm^2

Q20. Find the **total surface area** of the cuboid shown below with dimensions $8 \text{ cm} \times 5 \text{ cm} \times 3 \text{ cm}$.



- (A) 158 cm^2
- (B) 120 cm^2
- (C) 164 cm^2
- (D) 79 cm^2

Q21. Find the **volume** of a cylinder with radius 7 cm and height 10 cm. (Use $\pi = \frac{22}{7}$)

- (A) 1320 cm^3
- (B) 1440 cm^3
- (C) 1540 cm^3
- (D) 1650 cm^3



Q22. Simplify: $\frac{2^3 \times 2^{-4}}{2^2 \times 2^{-2}}$

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

Q23. Express 58,500,000 in **standard (scientific) notation**.

- (A) 5.85×10^7
- (B) 58.5×10^6
- (C) 5.85×10^6
- (D) 0.585×10^8

Q24. If 12 pens cost Rs 84, find the cost of 8 pens. (Direct proportion)

- (A) Rs 48
- (B) Rs 52
- (C) Rs 56
- (D) Rs 63

Q25. 10 men can dig a trench in 12 days. How many days will 8 men take to dig the same trench? (Inverse proportion)

- (A) 10 days
- (B) 15 days
- (C) 16 days
- (D) 20 days

Q26. Factorise completely: $6a^2b + 12ab^2 - 18abc$

- (A) $3ab(2a + 4b - 6c)$
- (B) $6a(ab + 2b^2 - 3bc)$



(C) $6ab(a + 2b - 3c)$

(D) $6b(a^2 + 2ab - 3ac)$

Q27. Factorise: $x^2 - 10x + 25$

(A) $(x - 5)^2$

(B) $(x + 5)^2$

(C) $(x - 5)(x + 5)$

(D) $(x - 5)(x - 10)$

Q28. Divide $(x^2 + 7x + 12)$ by $(x + 3)$. What is the quotient?

(A) $x + 3$

(B) $x + 5$

(C) $x + 6$

(D) $x + 4$

Q29. A fair die is thrown once. The six equally likely outcomes are shown below (even numbers are shaded). What is the probability of getting an **even number**?



Even outcomes $\{2, 4, 6\}$ are **shaded**

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

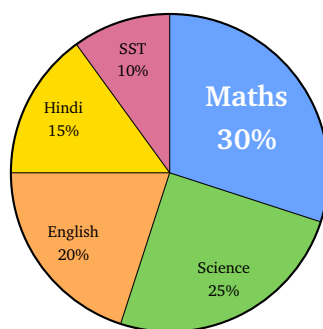
(B) $\frac{1}{2}$

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

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

Q30. The pie chart below shows the favourite subjects of 600 students. How many students prefer **Mathematics**?





- (A) 150
- (B) 160
- (C) 180
- (D) 200



Detailed Solutions

Q1.

Solution

Concept — Rational Numbers on the Number Line: A rational number lies between $-\frac{1}{2}$ and 0 if it is greater than -0.5 and less than 0.

Step 1 — Convert each option to a decimal:

- $-\frac{3}{4} = -0.75$
- $-\frac{1}{4} = -0.25$
- $-\frac{1}{8} = -0.125$
- $-\frac{2}{5} = -0.40$

Step 2 — Check which value lies between -0.5 and 0:

-0.25 , -0.125 , and -0.40 all satisfy $-0.5 < x < 0$.

But $-0.75 < -0.5$, so $-\frac{3}{4}$ is **NOT** between $-\frac{1}{2}$ and 0.

Why other options are wrong:

- Option (B) $-\frac{1}{4} = -0.25$: lies between -0.5 and 0.
- Option (C) $-\frac{1}{8} = -0.125$: lies between -0.5 and 0.
- Option (D) $-\frac{2}{5} = -0.40$: lies between -0.5 and 0.

Final Answer: $-\frac{3}{4}$ is NOT between $-\frac{1}{2}$ and 0 $\Rightarrow$ A

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

Q2.

Solution

Concept — Comparing Rational Numbers: To arrange rationals in ascending order, convert all to decimals (or a common denominator) and compare.

Step 1 — Convert to decimals:

$$-\frac{2}{3} \approx -0.667, \quad -\frac{1}{4} = -0.25, \quad \frac{3}{5} = 0.6, \quad \frac{7}{10} = 0.7$$



Step 2 — Arrange smallest to largest:

$$-0.667 < -0.25 < 0.6 < 0.7 \implies -\frac{2}{3} < -\frac{1}{4} < \frac{3}{5} < \frac{7}{10}$$

Why other options are wrong:

- Option (A): Reverses the order — places positive numbers first (descending).
- Option (B): Incorrectly swaps $-\frac{1}{4}$ and $-\frac{2}{3}$ ($-0.25 > -0.667$, so $-\frac{1}{4}$ should come after $-\frac{2}{3}$).
- Option (D): Places positive $\frac{3}{5}$ between two negative numbers — incorrect.

Final Answer: $-\frac{2}{3} < -\frac{1}{4} < \frac{3}{5} < \frac{7}{10} \implies \boxed{C}$

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

Q3.

Solution

Concept — Solving Linear Equations in One Variable: Isolate x by transposing terms across the equals sign.

Step 1 — Transpose and simplify:

$$3x - 7 = 2x + 9 \implies 3x - 2x = 9 + 7 \implies x = 16$$

Step 2 — Verification:

$$\text{LHS} = 3(16) - 7 = 48 - 7 = 41, \quad \text{RHS} = 2(16) + 9 = 32 + 9 = 41. \quad \checkmark$$

Why other options are wrong:

- Option (A) $x = 2$: LHS = -1 , RHS = 13 — not equal.
- Option (B) $x = 7$: LHS = 14 , RHS = 23 — not equal.
- Option (C) $x = 14$: LHS = 35 , RHS = 37 — not equal.

Final Answer: $x = 16 \implies \boxed{D}$

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



Q4.

Solution

Concept — Word Problems on Linear Equations: Assign a variable to the unknown and form an equation from the given conditions.

Step 1 — Set up the equation:

Let the smaller number be n ; then the larger is $n + 7$.

$$n + (n + 7) = 43 \Rightarrow 2n + 7 = 43 \Rightarrow 2n = 36 \Rightarrow n = 18$$

Step 2 — Find the larger number:

$$\text{Larger number} = 18 + 7 = 25$$

Why other options are wrong:

- Option (A) 18: This is the *smaller* number, not the larger.
- Option (C) 28: Smaller would be 21; sum = $21 + 28 = 49 \neq 43$.
- Option (D) 32: Smaller would be 25; sum = $25 + 32 = 57 \neq 43$.

Final Answer: Larger number = 25 $\Rightarrow$ B

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

Q5.

Solution

Concept — Equations with Fractional Coefficients: Multiply through by the LCM of all denominators to clear fractions.

Step 1 — LCM of 2 and 3 is 6; multiply both sides:

$$\frac{x}{2} + \frac{x}{3} = 10 \Rightarrow \frac{3x + 2x}{6} = 10 \Rightarrow \frac{5x}{6} = 10$$

Step 2 — Solve for x :

$$5x = 60 \Rightarrow x = 12$$

Why other options are wrong:

- Option (B) $x = 8$: $\frac{8}{2} + \frac{8}{3} = 4 + \frac{8}{3} \approx 6.67 \neq 10$.
- Option (C) $x = 15$: $\frac{15}{2} + \frac{15}{3} = 7.5 + 5 = 12.5 \neq 10$.



- Option (D) $x = 10$: $\frac{10}{2} + \frac{10}{3} = 5 + \frac{10}{3} \approx 8.33 \neq 10$.

Final Answer: $x = 12 \Rightarrow \boxed{A}$

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

Q6.

Solution

Concept — Angle Sum Property of a Quadrilateral: The sum of all interior angles of any quadrilateral equals 360.

Step 1 — Add the three known angles:

$$65 + 85 + 135 = 285$$

Step 2 — Find the fourth angle:

$$\text{Fourth angle} = 360 - 285 = 75$$

Why other options are wrong:

- Option (A) 65: Total = $65 + 65 + 85 + 135 = 350 \neq 360$.
- Option (B) 85: Total = $65 + 85 + 85 + 135 = 370 \neq 360$.
- Option (D) 95: Total = $65 + 85 + 135 + 95 = 380 \neq 360$.

Final Answer: Fourth angle = 75 $\Rightarrow \boxed{C}$

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

Q7.

Solution

Concept — Properties of a Parallelogram: In a parallelogram, co-interior angles (also called consecutive or adjacent angles) are supplementary, i.e., they add up to 180.

Step 1 — Identify the pair:

$\angle A$ and $\angle B$ are co-interior angles because $AD \parallel BC$ with transversal AB .

Step 2 — Calculate $\angle B$:

$$\angle A + \angle B = 180 \Rightarrow 70 + \angle B = 180 \Rightarrow \angle B = 110$$



Why other options are wrong:

- Option (A) 70: Opposite angles are equal in a parallelogram (not adjacent ones); $\angle C = 70$, not $\angle B$.
- Option (C) 120: $70 + 120 = 190 \neq 180$ — contradicts supplementary property.
- Option (D) 90: $70 + 90 = 160 \neq 180$ — only valid for rectangles.

Final Answer: $\angle B = 110 \Rightarrow \boxed{B}$

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

Q8.

Solution

Concept — Perfect Squares and Prime Factorisation: A number is a perfect square if and only if every prime in its factorisation appears an *even* number of times.

Step 1 — Prime factorisation of 720:

$$720 = 2^4 \times 3^2 \times 5^1$$

Step 2 — Identify unpaired factors:

2^4 (exponent 4, even) and 3^2 (exponent 2, even) are already paired.

5^1 (exponent 1, odd) is unpaired. Multiply by 5 to make 5^2 .

Step 3 — Verify:

$$720 \times 5 = 3600 = 2^4 \times 3^2 \times 5^2 = (2^2 \times 3 \times 5)^2 = 60^2 \quad \checkmark$$

Why other options are wrong:

- Option (A) $\times 2$: $1440 = 2^5 \times 3^2 \times 5$ — exponent of 2 becomes odd again.
- Option (B) $\times 3$: $2160 = 2^4 \times 3^3 \times 5$ — exponent of 3 becomes odd.
- Option (C) $\times 4 = 2^2$: $2880 = 2^6 \times 3^2 \times 5$ — factor of 5 still unpaired.

Final Answer: Multiply by 5 $\Rightarrow \boxed{D}$

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



Q9.

Solution

Concept — Long Division Method for Square Roots: Group digits in pairs from the right, find the largest digit whose square does not exceed each group, and build the root step by step.

Step 1 — Group the digits of 1764: $\overline{17} \overline{64}$

Step 2 — Long division process:

- *First group, 17:* Largest integer d with $d^2 \leq 17$ is $d = 4$ ($4^2 = 16$). Quotient so far: 4; remainder = $17 - 16 = 1$.
- *Bring down 64:* New dividend = 164.
- *New divisor base:* $2 \times 4 = 8$. Find digit e with $\overline{8e} \times e \leq 164$: $82 \times 2 = 164$, so $e = 2$.
- *Remainder* = $164 - 164 = 0$.

Quotient = 42, so $\sqrt{1764} = 42$.

Verification: $42^2 = 1764$ ✓

Why other options are wrong:

- Option (B) 44: $44^2 = 1936 \neq 1764$.
- Option (C) 46: $46^2 = 2116 \neq 1764$.
- Option (D) 48: $48^2 = 2304 \neq 1764$.

Final Answer: $\sqrt{1764} = 42 \Rightarrow \boxed{A}$

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

Q10.

Solution

Concept — Pythagorean Triplets: Positive integers (a, b, c) with $a < b < c$ form a Pythagorean triplet if and only if $a^2 + b^2 = c^2$.

Step 1 — Check each option:

- (5, 12, 13): $5^2 + 12^2 = 25 + 144 = 169 = 13^2$ ✓
- (8, 15, 17): $8^2 + 15^2 = 64 + 225 = 289 = 17^2$ ✓
- (7, 8, 9): $7^2 + 8^2 = 49 + 64 = 113 \neq 81 = 9^2$ ✗
- (20, 21, 29): $20^2 + 21^2 = 400 + 441 = 841 = 29^2$ ✓



Step 2 — Conclusion:

(7, 8, 9) fails the Pythagorean condition since $113 \neq 81$.

Why other options are wrong:

- Options (A), (B), (D) are all valid Pythagorean triplets as verified above.

Final Answer: (7, 8, 9) is NOT a Pythagorean triplet $\Rightarrow$ C

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

Q11.

Solution

Concept — Perfect Cubes via Prime Factorisation: A number is a perfect cube if and only if every prime in its factorisation has an exponent that is a multiple of 3.

Step 1 — Factorise each option:

- $216 = 2^3 \times 3^3 = 6^3$ — all exponents multiples of 3. Perfect cube. ✓
- $288 = 2^5 \times 3^2$ — exponent of 2 is 5 (not a multiple of 3); exponent of 3 is 2. NOT a perfect cube. ✗
- $343 = 7^3$ — perfect cube. ✓
- $512 = 2^9 = (2^3)^3 = 8^3$ — perfect cube. ✓

Why other options are wrong:

- Options (A), (C), (D) are $6^3, 7^3, 8^3$ respectively — all perfect cubes.

Final Answer: 288 is NOT a perfect cube $\Rightarrow$ B

Answer: (B) [Go Back to Q11](#)

Q12.

Solution

Concept — Cube Root by Prime Factorisation: Express the number as a perfect cube of a product of primes.

Step 1 — Prime factorisation of 10648:

$$10648 \div 2 = 5324, \quad 5324 \div 2 = 2662, \quad 2662 \div 2 = 1331 = 11^3$$



$$\therefore 10648 = 2^3 \times 11^3 = (2 \times 11)^3 = 22^3$$

Step 2 — Extract the cube root:

$$\sqrt[3]{10648} = 22$$

Why other options are wrong:

- Option (A) 18: $18^3 = 5832 \neq 10648$.
- Option (B) 20: $20^3 = 8000 \neq 10648$.
- Option (C) 21: $21^3 = 9261 \neq 10648$.

Final Answer: $\sqrt[3]{10648} = 22 \Rightarrow \boxed{D}$

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

Q13.

Solution

Concept — Profit and Selling Price:

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

Step 1 — Apply the formula with CP = 600 and Profit = 25%:

$$SP = 600 \times \left(1 + \frac{25}{100}\right) = 600 \times 1.25 = 750$$

Step 2 — Verify:

$$\text{Profit} = 750 - 600 = 150 = 25\% \text{ of } 600 \quad \checkmark$$

Why other options are wrong:

- Option (A) Rs 700: Profit = 100, which is 16.7% of 600, not 25%.
- Option (C) Rs 800: Profit = 200, which is 33.3% of 600, not 25%.
- Option (D) Rs 900: Profit = 300, which is 50% of 600, not 25%.

Final Answer: Selling Price = Rs 750 $\Rightarrow \boxed{B}$

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



Q14.

Solution**Concept — Compound Interest Formula:**

$$A = P\left(1 + \frac{r}{100}\right)^n, \quad \text{CI} = A - P$$

Step 1 — Values: $P = 5000$, $r = 10\%$, $n = 2$ years.**Step 2 — Calculate Amount:**

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

Step 3 — Compound Interest:

$$\text{CI} = 6050 - 5000 = 1050$$

Why other options are wrong:

- Option (B) Rs 1000: This is Simple Interest = $P \times r \times n \div 100 = 5000 \times 10\% \times 2 = 1000$. Ignores compounding.
- Option (A) Rs 900: Less than SI; impossible for compounded interest.
- Option (D) Rs 1100: Overcounts interest by using wrong power.

Final Answer: CI = Rs 1050 $\Rightarrow$ CAnswer: (C) [Go Back to Q14](#)

Q15.

Solution**Concept — Discount and Selling Price:**

$$\text{SP} = \text{MRP} \times \left(1 - \frac{\text{Discount}\%}{100}\right)$$

Step 1 — Apply with MRP = 1500 and Discount = 20%:

$$\text{SP} = 1500 \times \left(1 - \frac{20}{100}\right) = 1500 \times 0.80 = 1200$$



Step 2 — Verify:

$$\text{Discount} = 1500 - 1200 = 300 = 20\% \text{ of } 1500 \quad \checkmark$$

Why other options are wrong:

- Option (B) Rs 1300: Discount = 200 $\approx$ 13.3%, not 20%.
- Option (C) Rs 1400: Discount = 100 $\approx$ 6.7%, not 20%.
- Option (D) Rs 1250: Discount = 250 $\approx$ 16.7%, not 20%.

Final Answer: Selling Price = Rs 1200 $\Rightarrow$ A

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

Q16.

Solution

Concept — Subtraction of Algebraic Expressions: Change the sign of *every* term in the expression being subtracted, then add like terms.

Step 1 — Write the subtraction:

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

Step 2 — Change signs and collect like terms:

$$= 5x^2 + 4xy - 3y^2 - 3x^2 + 2xy - y^2 = (5-3)x^2 + (4+2)xy + (-3-1)y^2 = 2x^2 + 6xy - 4y^2$$

Why other options are wrong:

- Option (A) $2x^2 - 6xy + 4y^2$: Did not change signs of $-2xy$ and $+y^2$ in the subtracted bracket.
- Option (B) $2x^2 + 6xy + 4y^2$: Incorrect sign on y^2 ($-3y^2 - y^2 = -4y^2$, not $+4y^2$).
- Option (C) $8x^2 + 2xy - 4y^2$: Added x^2 coefficients instead of subtracting.

Final Answer: $2x^2 + 6xy - 4y^2 \Rightarrow$ D

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



Q17.

Solution

Concept — Identity $(a - b)^2 = a^2 - 2ab + b^2$: Write $97 = 100 - 3$ to use the identity.

Step 1 — Identify a and b : $a = 100, b = 3$.

Step 2 — Apply the identity:

$$(97)^2 = (100 - 3)^2 = 100^2 - 2 \times 100 \times 3 + 3^2 = 10000 - 600 + 9 = 9409$$

Why other options are wrong:

- Option (A) 9300: Omitted the $+b^2 = +9$ term.
- Option (C) 9421: Arithmetic error in computing $2 \times 100 \times 3 = 600$ (used 579 instead).
- Option (D) 9500: Only subtracted 500 from 10000; incorrect computation of $2ab$.

Final Answer: $(97)^2 = 9409 \Rightarrow \boxed{B}$

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

Q18.

Solution

Concept — Identity $(a + b)(a - b) = a^2 - b^2$: This is the difference-of-squares identity.

Step 1 — Recognise the form:

$(3x + 4)(3x - 4)$ matches $(a + b)(a - b)$ with $a = 3x$ and $b = 4$.

Step 2 — Apply the identity:

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

Why other options are wrong:

- Option (A) $9x^2 + 24x - 16$: Treats as $(3x + 4)^2 - 8(3x)$ — middle terms cancel in $(a + b)(a - b)$.
- Option (B) $6x^2 - 16$: Incorrectly computed $(3x)^2 = 6x^2$ instead of $9x^2$.
- Option (D) $9x^2 + 16$: Wrong sign — difference of squares gives $-b^2$, not $+b^2$.

Final Answer: $9x^2 - 16 \Rightarrow \boxed{C}$



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

Q19.

Solution

Concept — Area of a Trapezium:

$$\text{Area} = \frac{1}{2} \times (\text{sum of parallel sides}) \times \text{height}$$

Step 1 — Identify values: Parallel sides $a = 12$ cm, $b = 8$ cm; height $h = 6$ cm.

Step 2 — Apply the formula:

$$\text{Area} = \frac{1}{2} \times (12 + 8) \times 6 = \frac{1}{2} \times 20 \times 6 = 60 \text{ cm}^2$$

Why other options are wrong:

- Option (A) 90 cm^2 : Used height = 9 instead of 6: $\frac{1}{2} \times 20 \times 9 = 90$.
- Option (B) 80 cm^2 : Used height = 8: $\frac{1}{2} \times 20 \times 8 = 80$.
- Option (C) 72 cm^2 : Only multiplied the longer side by height: $12 \times 6 = 72$.

Final Answer: Area = $60 \text{ cm}^2 \Rightarrow \boxed{D}$

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

Q20.

Solution

Concept — Total Surface Area of a Cuboid:

$$\text{TSA} = 2(lb + bh + lh)$$

where l , b , h are the length, breadth, and height.

Step 1 — Identify values: $l = 8$ cm, $b = 5$ cm, $h = 3$ cm.

Step 2 — Compute each face area and total:

$$lb = 8 \times 5 = 40, \quad bh = 5 \times 3 = 15, \quad lh = 8 \times 3 = 24$$

$$\text{TSA} = 2(40 + 15 + 24) = 2 \times 79 = 158 \text{ cm}^2$$



Why other options are wrong:

- Option (B) 120 cm^2 : Computed only $2(lb + bh) = 2 \times 55 = 110$ or used wrong dimensions.
- Option (C) 164 cm^2 : Arithmetic error in summing the face areas.
- Option (D) 79 cm^2 : Forgot to multiply by 2 (counted each face only once).

Final Answer: $\text{TSA} = 158 \text{ cm}^2 \Rightarrow \boxed{A}$

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

Q21.

Solution

Concept — Volume of a Cylinder: $V = \pi r^2 h$

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

Step 2 — Calculate:

$$V = \frac{22}{7} \times 7^2 \times 10 = \frac{22}{7} \times 49 \times 10 = 22 \times 7 \times 10 = 1540 \text{ cm}^3$$

Why other options are wrong:

- Option (A) 1320 cm^3 : Used $r = 6$ instead of $r = 7$ ($\frac{22}{7} \times 36 \times 10 \approx 1131.4$, closer to wrong option).
- Option (B) 1440 cm^3 : Error in computing $r^2 = 49$ (used approximate 46.2).
- Option (D) 1650 cm^3 : Used $\pi \approx 3.3$ (inflated approximation).

Final Answer: $\text{Volume} = 1540 \text{ cm}^3 \Rightarrow \boxed{C}$

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

Q22.

Solution

Concept — Laws of Exponents: $a^m \times a^n = a^{m+n}$ and $\frac{a^m}{a^n} = a^{m-n}$.

Step 1 — Simplify numerator:

$$2^3 \times 2^{-4} = 2^{3+(-4)} = 2^{-1}$$



Step 2 — Simplify denominator:

$$2^2 \times 2^{-2} = 2^{2+(-2)} = 2^0 = 1$$

Step 3 — Divide:

$$\frac{2^{-1}}{1} = 2^{-1} = \frac{1}{2}$$

Why other options are wrong:

- Option (A) 2: Sign error — $2^{-1} = \frac{1}{2}$, not 2.
- Option (C) $\frac{1}{4}$: Error in adding exponents (mistakenly computed 2^{-2}).
- Option (D) 1: Ignored the -4 exponent in the numerator.

Final Answer: $\frac{1}{2} \Rightarrow \boxed{B}$

Answer: (B) [Go Back to Q22](#)

Q23.

Solution

Concept — Standard (Scientific) Notation: Express a number as $m \times 10^n$ where $1 \leq m < 10$ and n is an integer.

Step 1 — Move the decimal point:

$$58,500,000 = 5.85 \times 10,000,000 = 5.85 \times 10^7$$

(Decimal moves 7 places left from 58500000 to 5.85.)

Step 2 — Confirm $m \in [1, 10)$: $m = 5.85$, which satisfies $1 \leq 5.85 < 10$. ✓

Why other options are wrong:

- Option (B) 58.5×10^6 : Not standard form ($58.5 \geq 10$).
- Option (C) 5.85×10^6 : Off by a factor of 10 ($10^6 = 10^7 \div 10$).
- Option (D) 0.585×10^8 : Not standard form ($0.585 < 1$).

Final Answer: $5.85 \times 10^7 \Rightarrow \boxed{A}$

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



Q24.

Solution

Concept — Direct Proportion: When two quantities are directly proportional, their ratio is constant: $\frac{x_1}{y_1} = \frac{x_2}{y_2}$.

Step 1 — Find the cost per pen:

$$\text{Cost per pen} = \frac{84}{12} = \text{Rs } 7$$

Step 2 — Cost of 8 pens:

$$\text{Cost} = 7 \times 8 = \text{Rs } 56$$

Why other options are wrong:

- Option (A) Rs 48: Implies cost per pen = 6 (incorrect; $12 \times 6 = 72 \neq 84$).
- Option (B) Rs 52: Implies cost per pen = 6.5 (incorrect).
- Option (D) Rs 63: Implies cost per pen = 7.875 (not an exact value).

Final Answer: Cost of 8 pens = Rs 56 $\Rightarrow$ C

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

Q25.

Solution

Concept — Inverse Proportion: More workers $\Rightarrow$ fewer days. The product Men $\times$ Days remains constant.

Step 1 — Set up the equation:

Let $M_1 = 10$, $D_1 = 12$, $M_2 = 8$, $D_2 = ?$

$$M_1 \times D_1 = M_2 \times D_2 \Rightarrow 10 \times 12 = 8 \times D_2$$

Step 2 — Solve:

$$D_2 = \frac{120}{8} = 15 \text{ days}$$

Why other options are wrong:

- Option (A) 10 days: Fewer men should require *more* days, not the same.
- Option (C) 16 days: $8 \times 16 = 128 \neq 120$.



- Option (D) 20 days: $8 \times 20 = 160 \neq 120$.

Final Answer: 8 men take 15 days $\Rightarrow$ B

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

Q26.

Solution

Concept — Factorisation by Common Factor Method: Find the HCF of all terms and factor it out.

Step 1 — Find the HCF:

$$6a^2b + 12ab^2 - 18abc$$

Numerical HCF: $\gcd(6, 12, 18) = 6$.

Variable HCF: each term contains at least a^1 and b^1 , so variable HCF = ab .

Combined HCF = $6ab$.

Step 2 — Factor out $6ab$:

$$= 6ab \left(\frac{6a^2b}{6ab} + \frac{12ab^2}{6ab} - \frac{18abc}{6ab} \right) = 6ab(a + 2b - 3c)$$

Why other options are wrong:

- Option (A) $3ab(2a + 4b - 6c)$: Factored out only $3ab$, not the full HCF $6ab$. While mathematically equivalent, it is not *fully* factored.
- Option (B) $6a(\dots)$: Did not extract b from the common factor.
- Option (D) $6b(\dots)$: Did not extract a from the common factor.

Final Answer: $6ab(a + 2b - 3c) \Rightarrow$ C

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



Q27.

Solution**Concept — Perfect Square Trinomial:** $(a - b)^2 = a^2 - 2ab + b^2$.**Step 1 — Recognise the pattern:**

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

This matches $(a - b)^2$ with $a = x$ and $b = 5$.**Step 2 — Write the factored form:**

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

Why other options are wrong:

- Option (B) $(x + 5)^2 = x^2 + 10x + 25$: Middle term is $+10x$, not $-10x$.
- Option (C) $(x - 5)(x + 5) = x^2 - 25$: No middle term — this is the difference of squares.
- Option (D) $(x - 5)(x - 10) = x^2 - 15x + 50$: Wrong middle term and constant.

Final Answer: $(x - 5)^2 \Rightarrow \boxed{A}$ **Answer: (A)** [Go Back to Q27](#)

Q28.

Solution**Concept — Division of a Polynomial by a Linear Factor:** Factorise the dividend and cancel the common factor.**Step 1 — Factorise the dividend** $x^2 + 7x + 12$:

Find two numbers whose product is 12 and sum is 7: they are 3 and 4.

$$x^2 + 7x + 12 = x^2 + 3x + 4x + 12 = x(x + 3) + 4(x + 3) = (x + 3)(x + 4)$$

Step 2 — Divide by $(x + 3)$:

$$\frac{(x + 3)(x + 4)}{x + 3} = x + 4$$

Why other options are wrong:

- Option (A) $x + 3$: $(x + 3)^2 = x^2 + 6x + 9 \neq x^2 + 7x + 12$.
- Option (B) $x + 5$: $(x + 3)(x + 5) = x^2 + 8x + 15 \neq x^2 + 7x + 12$.
- Option (C) $x + 6$: $(x + 3)(x + 6) = x^2 + 9x + 18 \neq x^2 + 7x + 12$.

Final Answer: Quotient $= x + 4 \Rightarrow \boxed{D}$

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

Q29.

Solution

Concept — Classical Probability:

$$P(\text{event}) = \frac{\text{Number of favourable outcomes}}{\text{Total number of equally likely outcomes}}$$

Step 1 — Identify the sample space:

When a fair die is thrown: $S = \{1, 2, 3, 4, 5, 6\}$, so $n(S) = 6$.

Step 2 — Count favourable outcomes:

Even numbers on a die: $\{2, 4, 6\}$, so $n(E) = 3$.

Step 3 — Compute probability:

$$P(\text{even}) = \frac{3}{6} = \frac{1}{2}$$

Why other options are wrong:

- Option (A) $\frac{1}{3}$: Would require only 2 favourable outcomes (incorrect).
- Option (C) $\frac{2}{3}$: Would require 4 favourable outcomes (the number of odd faces, not even).
- Option (D) $\frac{1}{6}$: Probability of getting one specific number (e.g., only the face showing 2).

Final Answer: $P(\text{even}) = \frac{1}{2} \Rightarrow \boxed{B}$

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



Q30.

Solution

Concept — Reading a Pie Chart: Each sector's central angle is proportional to its percentage. Number of students for a subject = (percentage/100) × total students.

Step 1 — Identify the percentage for Mathematics:

From the pie chart: Mathematics sector = 30%.

Step 2 — Calculate the number of students:

$$\text{Students preferring Maths} = \frac{30}{100} \times 600 = 0.30 \times 600 = 180$$

Why other options are wrong:

- Option (A) 150: = 25% of 600 — corresponds to Science, not Mathematics.
- Option (B) 160: Does not correspond to any percentage given in the chart.
- Option (D) 200: Would require 33. $\bar{3}$ %, which is more than the given 30%.

Final Answer: 180 students prefer Mathematics ⇒ C

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



Answer Key

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

