

SHRESHTA NETS Mathematics

Sample Paper – 5

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 is the **multiplicative inverse** of $-\frac{7}{9}$?

- (A) $\frac{7}{9}$
(B) $\frac{9}{7}$
(C) $-\frac{7}{9}$
(D) $-\frac{9}{7}$

Q2. Simplify: $-\frac{3}{4} + \frac{5}{6} - \frac{1}{3}$

- (A) $\frac{1}{12}$
(B) $-\frac{1}{4}$



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

(D) $\frac{1}{4}$

Q3. Solve for x : $2(x + 5) - 3(2x - 1) = -7$

(A) 5

(B) -5

(C) 3

(D) -3

Q4. The sum of three consecutive odd integers is 81. Find the **largest** integer.

(A) 25

(B) 27

(C) 29

(D) 31

Q5. A rectangle has a perimeter of 68 cm. Its length is 8 cm more than its breadth. Find the **breadth**.

(A) 13 cm

(B) 21 cm

(C) 17 cm

(D) 15 cm

Q6. Each interior angle of a regular **hexagon** measures

(A) 90

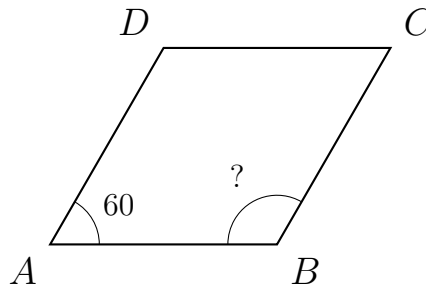
(B) 108

(C) 135

(D) 120



- Q7.** In the rhombus $ABCD$ shown below, one interior angle is 60. Find the **adjacent interior angle** (marked ?).



- (A) 60
(B) 120
(C) 90
(D) 150
- Q8.** The prime factorisation of 1440 is shown in the box below. What is the **smallest positive integer** by which 1440 must be multiplied to make it a **perfect square**?

$$1440 = 2^5 \times 3^2 \times 5^1$$

- (A) 5
(B) 20
(C) 10
(D) 40
- Q9.** Find $\sqrt{5184}$ using the prime factorisation method.

- (A) 72
(B) 68
(C) 76
(D) 64



- Q10.** Find the Pythagorean triplet generated by the formula $(2m, m^2 - 1, m^2 + 1)$ when $m = 5$.
- (A) (3, 4, 5)
(B) (6, 8, 10)
(C) (8, 15, 17)
(D) (10, 24, 26)
- Q11.** What is the **smallest positive integer** by which 72 must be multiplied to make it a **perfect cube**?
- (A) 2
(B) 3
(C) 6
(D) 9
- Q12.** Find $\sqrt[3]{4913}$.
- (A) 13
(B) 15
(C) 17
(D) 19
- Q13.** A trader bought goods for Rs 800 and sold them at a **15% loss**. Find the **selling price**.
- (A) Rs 680
(B) Rs 720
(C) Rs 740
(D) Rs 760
- Q14.** Find the **amount** (Principal + Interest) when Rs 6000 is invested at 10% per annum for 2 years, compounded annually.

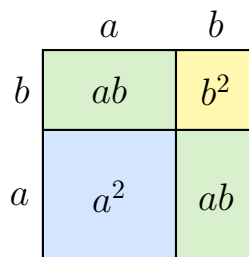


- (A) Rs 6600
- (B) Rs 7000
- (C) Rs 7200
- (D) Rs 7260

Q15. After a 30% discount, an article is sold for Rs 2100. Find the **marked price**.

- (A) Rs 2700
- (B) Rs 3000
- (C) Rs 3500
- (D) Rs 2800

Q16. The area diagram below shows a square of side $(a + b)$ divided into four rectangles. Which algebraic identity does this diagram **illustrate**?



- (A) $(a - b)^2 = a^2 - 2ab + b^2$
- (B) $a^2 - b^2 = (a + b)(a - b)$
- (C) $(a + b)^2 = a^2 + 2ab + b^2$
- (D) $(a + b)(a - b) = a^2 - b^2$

Q17. Using the identity $(a + b)^2 = a^2 + 2ab + b^2$, find the value of $(105)^2$.

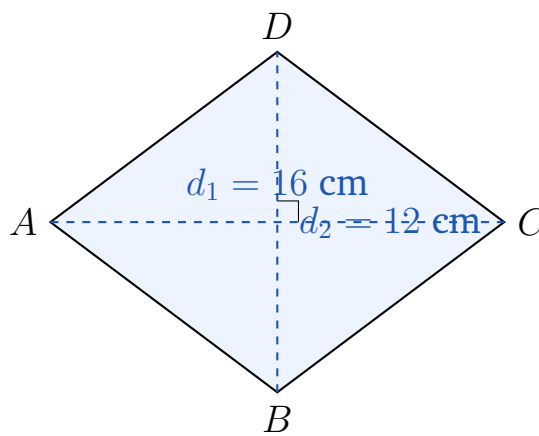
- (A) 11025
- (B) 10025
- (C) 11050
- (D) 10525



Q18. Expand and simplify: $(3x + 5y)(3x - 5y)$

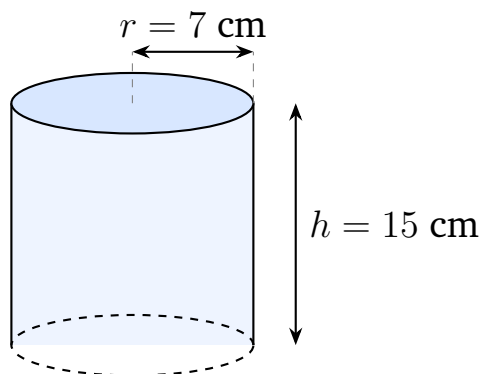
- (A) $9x^2 + 25y^2$
- (B) $6x^2 - 25y^2$
- (C) $9x^2 + 30xy - 25y^2$
- (D) $9x^2 - 25y^2$

Q19. Find the **area** of the rhombus $ABCD$ shown below, where the diagonals are $d_1 = 16$ cm and $d_2 = 12$ cm.



- (A) 48 cm^2
- (B) 96 cm^2
- (C) 192 cm^2
- (D) 24 cm^2

Q20. Find the **curved surface area** of the cylinder shown below. (Use $\pi = \frac{22}{7}$)



- (A) 330 cm^2
- (B) 440 cm^2
- (C) 660 cm^2
- (D) 924 cm^2

Q21. The outer radius of a circular ring is 10 cm and the inner radius is 4 cm. Find the **area of the ring**. (Use $\pi = \frac{22}{7}$)

- (A) 264 cm^2
- (B) 314 cm^2
- (C) 200 cm^2
- (D) 236 cm^2

Q22. Simplify: $\frac{3^4 \times 3^{-6}}{3^2 \times 3^{-5}}$

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

Q23. Express 0.0000045 in **standard (scientific) notation**.

- (A) 4.5×10^{-5}
- (B) 4.5×10^{-6}
- (C) 45×10^{-7}
- (D) 0.45×10^{-5}

Q24. 4 pipes can fill a tank in 15 hours. How many hours will 6 pipes take to fill the same tank? (Inverse proportion)

- (A) 6 hours
- (B) 8 hours



(C) 10 hours

(D) 12 hours

Q25. If 8 kg of sugar costs Rs 320, find the cost of 13 kg of sugar. (Direct proportion)

(A) Rs 520

(B) Rs 480

(C) Rs 460

(D) Rs 560

Q26. Factorise: $4x^2y - 8xy^2 + 12x^2y^2$

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

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

(C) $2xy(2x - 4y + 6xy)$

(D) $4xy(x - 2y + 3xy)$

Q27. Factorise: $25m^2 - 49n^2$

(A) $(5m + 7n)^2$

(B) $(5m - 7n)(5m + 7n)$

(C) $(5m - 7n)^2$

(D) $(m - 7n)(m + 7n)$

Q28. Factorise: $x^2 + 11x + 30$

(A) $(x + 3)(x + 10)$

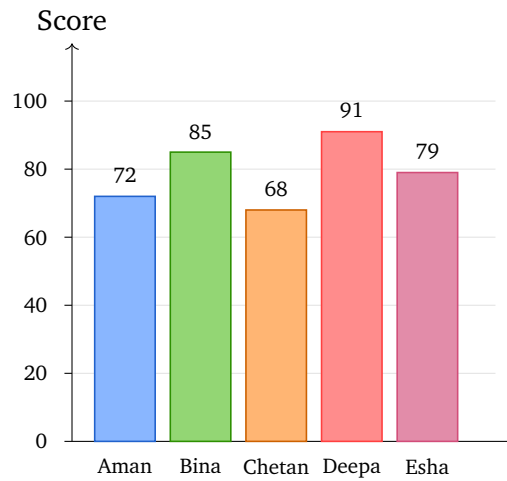
(B) $(x + 2)(x + 15)$

(C) $(x + 5)(x + 6)$

(D) $(x + 4)(x + 7)$

Q29. The bar chart below shows the test scores of 5 students. Which student scored the **highest**?





- (A) Aman
- (B) Bina
- (C) Esha
- (D) Deepa

Q30. A bag contains 6 red, 4 blue, and 2 green balls. If one ball is drawn at random, what is the probability that it is **green**?

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



Detailed Solutions

Q1.

Solution

Concept — Multiplicative Inverse (Reciprocal): The multiplicative inverse of $\frac{a}{b}$ is $\frac{b}{a}$ (flip numerator and denominator). The negative sign is retained.

Step 1 — Apply the definition:

$$\text{Multiplicative inverse of } -\frac{7}{9} = \frac{1}{-\frac{7}{9}} = -\frac{9}{7}$$

Step 2 — Verify the product equals 1:

$$-\frac{7}{9} \times \left(-\frac{9}{7}\right) = +\frac{7 \times 9}{9 \times 7} = 1 \quad \checkmark$$

Why other options are wrong:

- Option (A) $\frac{7}{9}$: Positive reciprocal; product = $-\frac{7}{9} \times \frac{7}{9} = -\frac{49}{81} \neq 1$.
- Option (B) $\frac{9}{7}$: Positive reciprocal; product = $-\frac{7}{9} \times \frac{9}{7} = -1 \neq 1$.
- Option (C) $-\frac{7}{9}$: The number itself; product = $\left(-\frac{7}{9}\right)^2 = \frac{49}{81} \neq 1$.

Final Answer: $-\frac{9}{7} \Rightarrow \boxed{D}$

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

Q2.

Solution

Concept — Addition/Subtraction of Rational Numbers: Convert all fractions to a common denominator (LCD), then combine numerators.

Step 1 — Find the LCD of 4, 6, and 3:

$$\text{LCD}(4, 6, 3) = 12.$$

Step 2 — Convert and compute:

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



Why other options are wrong:

- Option (A) $\frac{1}{12}$: Incorrect — wrong sign or LCD computation.
- Option (C) $-\frac{1}{12}$: Wrong — $-3/12$ simplifies to $-1/4$, not $-1/12$.
- Option (D) $\frac{1}{4}$: Dropped the negative sign from the result.

Final Answer: $-\frac{3}{4} + \frac{5}{6} - \frac{1}{3} = -\frac{1}{4} \Rightarrow \boxed{B}$

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

Q3.

Solution

Concept — Linear Equations via Distributive Law: Expand the brackets using the distributive property, collect like terms, then isolate x .

Step 1 — Expand the brackets:

$$2(x + 5) - 3(2x - 1) = -7 \Rightarrow 2x + 10 - 6x + 3 = -7 \Rightarrow -4x + 13 = -7$$

Step 2 — Solve for x :

$$-4x = -7 - 13 = -20 \Rightarrow x = \frac{-20}{-4} = 5$$

Step 3 — Verify:

$$2(5 + 5) - 3(10 - 1) = 2(10) - 3(9) = 20 - 27 = -7 \quad \checkmark$$

Why other options are wrong:

- Option (B) $x = -5$: $2(0) - 3(-11) = 0 + 33 = 33 \neq -7$.
- Option (C) $x = 3$: $2(8) - 3(5) = 16 - 15 = 1 \neq -7$.
- Option (D) $x = -3$: $2(2) - 3(-7) = 4 + 21 = 25 \neq -7$.

Final Answer: $x = 5 \Rightarrow \boxed{A}$

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



Q4.

Solution

Concept — Consecutive Odd Integers: Three consecutive odd integers differ by 2. Assign the smallest as n , so the three are $n, n + 2, n + 4$.

Step 1 — Set up and solve the equation:

$$n + (n + 2) + (n + 4) = 81 \Rightarrow 3n + 6 = 81 \Rightarrow 3n = 75 \Rightarrow n = 25$$

Step 2 — Find the three integers and identify the largest:

Integers: 25, 27, 29. Largest = 29.

Step 3 — Verify: $25 + 27 + 29 = 81 \checkmark$

Why other options are wrong:

- Option (A) 25: This is the *smallest* integer, not the largest.
- Option (B) 27: This is the *middle* integer.
- Option (D) 31: If largest = 31, the others are 27, 29; sum = $87 \neq 81$.

Final Answer: Largest integer = 29 $\Rightarrow$ C

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

Q5.

Solution

Concept — Perimeter of a Rectangle: Perimeter = $2(\text{length} + \text{breadth})$.

Step 1 — Assign variables and set up the equation:

Let breadth = b cm; then length = $(b + 8)$ cm.

$$2((b + 8) + b) = 68 \Rightarrow 2(2b + 8) = 68 \Rightarrow 4b + 16 = 68 \Rightarrow 4b = 52$$

Step 2 — Solve:

$$b = \frac{52}{4} = 13 \text{ cm}$$

Step 3 — Verify: Length = 21 cm; Perimeter = $2(13 + 21) = 2 \times 34 = 68 \text{ cm} \checkmark$

Why other options are wrong:



- Option (B) 21 cm: This is the *length* ($b + 8 = 13 + 8 = 21$), not the breadth.
- Option (C) 17 cm: Length = 25; perimeter = $2(17 + 25) = 84 \neq 68$.
- Option (D) 15 cm: Length = 23; perimeter = $2(15 + 23) = 76 \neq 68$.

Final Answer: Breadth = 13 cm $\Rightarrow$ A

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

Q6.

Solution

Concept — Interior Angles of Regular Polygons: Sum of interior angles = $(n - 2) \times 180$; each angle of a regular n -gon = $\frac{(n - 2) \times 180}{n}$.

Step 1 — Sum of angles of a hexagon ($n = 6$):

$$(6 - 2) \times 180 = 4 \times 180 = 720$$

Step 2 — Each angle of a regular hexagon:

$$\frac{720}{6} = 120$$

Why other options are wrong:

- Option (A) 90: Interior angle of a square (regular 4-gon): $\frac{2 \times 180}{4} = 90$.
- Option (B) 108: Interior angle of a regular *pentagon* ($n = 5$): $\frac{3 \times 180}{5} = 108$.
- Option (C) 135: Interior angle of a regular *octagon* ($n = 8$): $\frac{6 \times 180}{8} = 135$.

Final Answer: Each angle of a regular hexagon = 120 $\Rightarrow$ D

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



Q7.

Solution

Concept — Adjacent Angles in a Rhombus: A rhombus is a parallelogram, so adjacent (co-interior) angles are *supplementary*: they add up to 180.

Step 1 — Identify the pair:

$\angle A$ and $\angle B$ are adjacent angles in rhombus $ABCD$.

Step 2 — Calculate:

$$\angle A + \angle B = 180 \Rightarrow 60 + \angle B = 180 \Rightarrow \angle B = 120$$

Why other options are wrong:

- Option (A) 60: *Opposite* angles of a rhombus are equal (so $\angle C = 60$), not adjacent ones.
- Option (C) 90: A rhombus with 90 angles is a square; here $\angle A = 60 \neq 90$.
- Option (D) 150: $60 + 150 = 210 \neq 180$ — violates the supplementary property.

Final Answer: $\angle B = 120 \Rightarrow \boxed{B}$

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

Q8.

Solution

Concept — Perfect Square via Prime Factorisation: A perfect square has all prime exponents *even*. Identify unpaired primes and multiply by the product of those primes to pair them.

Step 1 — Analyse the factorisation:

$$1440 = 2^5 \times 3^2 \times 5^1$$

- 2^5 : exponent 5 (odd) $\Rightarrow$ one factor of 2 unpaired.
- 3^2 : exponent 2 (even) $\Rightarrow$ fully paired $\checkmark$
- 5^1 : exponent 1 (odd) $\Rightarrow$ one factor of 5 unpaired.

Step 2 — Multiply by $2^1 \times 5^1 = 10$:

$$1440 \times 10 = 14400 = 2^6 \times 3^2 \times 5^2 = (2^3 \times 3 \times 5)^2 = 120^2 \quad \checkmark$$

Why other options are wrong:



- Option (A) 5: $1440 \times 5 = 7200 = 2^5 \times 3^2 \times 5^2$ — exponent of 2 is still 5 (odd). Not a perfect square.
- Option (B) 20: $20 = 2^2 \times 5$; result $= 2^7 \times 3^2 \times 5^2$ — exponent of 2 becomes 7 (odd).
- Option (D) 40: Although $1440 \times 40 = 2^8 \times 3^2 \times 5^2$ is a perfect square, $40 > 10$, so 10 is the *smallest* such multiplier.

Final Answer: Multiply by 10 $\Rightarrow$ C

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

Q9.

Solution

Concept — Square Root by Prime Factorisation: Express the number as a product of primes, group into pairs, and take one factor from each pair.

Step 1 — Prime factorisation of 5184:

$$5184 = 2 \times 2592 = 2^2 \times 1296 = 2^3 \times 648 = 2^4 \times 324 = 2^5 \times 162 = 2^6 \times 81 = 2^6 \times 3^4$$

Step 2 — Extract the square root:

$$\sqrt{5184} = \sqrt{2^6 \times 3^4} = 2^3 \times 3^2 = 8 \times 9 = 72$$

Step 3 — Verify: $72^2 = 5184$ ✓

Why other options are wrong:

- Option (B) 68: $68^2 = 4624 \neq 5184$.
- Option (C) 76: $76^2 = 5776 \neq 5184$.
- Option (D) 64: $64^2 = 4096 \neq 5184$.

Final Answer: $\sqrt{5184} = 72 \Rightarrow$ A

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



Q10.

Solution

Concept — Pythagorean Triplet Formula: Substituting a positive integer $m > 1$ into $(2m, m^2 - 1, m^2 + 1)$ always yields a Pythagorean triplet.

Step 1 — Substitute $m = 5$:

$$2m = 2 \times 5 = 10, \quad m^2 - 1 = 25 - 1 = 24, \quad m^2 + 1 = 25 + 1 = 26$$

Step 2 — Verify:

$$10^2 + 24^2 = 100 + 576 = 676 = 26^2 \quad \checkmark$$

Why other options are wrong:

- Option (A) (3, 4, 5): Generated by $m = 2$: (4, 3, 5). Not $m = 5$.
- Option (B) (6, 8, 10): Generated by $m = 3$: (6, 8, 10). Not $m = 5$.
- Option (C) (8, 15, 17): Generated by $m = 4$: (8, 15, 17). Not $m = 5$.

Final Answer: (10, 24, 26) $\Rightarrow$ D

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

Q11.

Solution

Concept — Perfect Cube via Prime Factorisation: A perfect cube has all prime exponents as *multiples of 3*. Identify under-represented primes and supply the missing factors.

Step 1 — Factorise 72:

$$72 = 2^3 \times 3^2$$

- 2^3 : exponent 3 (multiple of 3) $\Rightarrow$ fully cubed $\checkmark$
- 3^2 : exponent 2 (not a multiple of 3) $\Rightarrow$ needs one more factor of 3.

Step 2 — Multiply by 3:

$$72 \times 3 = 216 = 2^3 \times 3^3 = (2 \times 3)^3 = 6^3 \quad \checkmark$$

Why other options are wrong:



- Option (A) 2: $72 \times 2 = 144 = 2^4 \times 3^2$ — neither exponent is a multiple of 3.
- Option (C) 6: $72 \times 6 = 432 = 2^4 \times 3^3$ — exponent of 2 becomes 4 (not a multiple of 3).
- Option (D) 9: $72 \times 9 = 648 = 2^3 \times 3^4$ — exponent of 3 becomes 4 (not a multiple of 3).

Final Answer: Multiply by 3 $\Rightarrow$ B

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

Q12.

Solution

Concept — Cube Root by Prime Factorisation: Express the number as k^3 by finding the prime factorisation.

Step 1 — Factorise 4913:

$$4913 \div 17 = 289 = 17^2 \Rightarrow 4913 = 17 \times 17^2 = 17^3$$

Step 2 — Extract the cube root:

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

Step 3 — Verify: $17^3 = 17 \times 289 = 4913 \checkmark$

Why other options are wrong:

- Option (A) 13: $13^3 = 2197 \neq 4913$.
- Option (B) 15: $15^3 = 3375 \neq 4913$.
- Option (D) 19: $19^3 = 6859 \neq 4913$.

Final Answer: $\sqrt[3]{4913} = 17 \Rightarrow$ C

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



Q13.

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

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

Step 1 — Apply the formula: $CP = 800$, $\text{Loss} = 15\%$.

$$SP = 800 \times \left(1 - \frac{15}{100}\right) = 800 \times 0.85 = 680$$

Step 2 — Verify:

$$\text{Loss} = 800 - 680 = 120 = 15\% \text{ of } 800 \quad \checkmark$$

Why other options are wrong:

- Option (B) Rs 720: Loss = 80, which is 10% of 800, not 15%.
- Option (C) Rs 740: Loss = 60, which is 7.5% of 800, not 15%.
- Option (D) Rs 760: Loss = 40, which is 5% of 800, not 15%.

Final Answer: Selling Price = Rs 680 $\Rightarrow$ AAnswer: (A) [Go Back to Q13](#)

Q14.

Solution**Concept — Compound Interest Formula:**

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

Step 1 — Values: $P = 6000$, $r = 10\%$, $n = 2$ years.**Step 2 — Calculate the amount:**

$$A = 6000 \times \left(1 + \frac{10}{100}\right)^2 = 6000 \times (1.1)^2 = 6000 \times 1.21 = 7260$$

Step 3 — Verify year by year:

Year 1: Interest = 10% of 6000 = 600; Amount = 6600.



Year 2: Interest = 10% of 6600 = 660; Amount = 7260. ✓

Why other options are wrong:

- Option (A) Rs 6600: Only accounts for *one* year of compounding, not two.
- Option (B) Rs 7000: Arbitrary incorrect value.
- Option (C) Rs 7200: This is the Simple Interest amount ($P + P \times r \times n \div 100 = 6000 + 1200$), ignoring the effect of compounding.

Final Answer: Amount = Rs 7260 $\Rightarrow$ D

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

Q15.

Solution

Concept — Marked Price from Discounted Selling Price:

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

Step 1 — Apply the formula: SP = 2100, Discount = 30%.

$$MP = \frac{2100}{1 - \frac{30}{100}} = \frac{2100}{0.70} = 3000$$

Step 2 — Verify:

$$\text{Discount} = 30\% \text{ of } 3000 = 900; \quad SP = 3000 - 900 = 2100 \quad \checkmark$$

Why other options are wrong:

- Option (A) Rs 2700: $2700 \times 0.70 = 1890 \neq 2100$.
- Option (C) Rs 3500: $3500 \times 0.70 = 2450 \neq 2100$.
- Option (D) Rs 2800: $2800 \times 0.70 = 1960 \neq 2100$.

Final Answer: Marked Price = Rs 3000 $\Rightarrow$ B

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



Q16.

Solution

Concept — Geometric Proof of Algebraic Identities: Area of the whole square = sum of areas of four rectangular pieces.

Step 1 — Identify each region:

- Bottom-left square ($a \times a$): area = a^2
- Bottom-right rectangle ($b \times a$): area = ab
- Top-left rectangle ($a \times b$): area = ab
- Top-right square ($b \times b$): area = b^2

Step 2 — Equate total area:

$$\text{Area of whole square} = (a + b)^2 = a^2 + ab + ab + b^2 = a^2 + 2ab + b^2$$

Why other options are wrong:

- Option (A) $(a - b)^2 = a^2 - 2ab + b^2$: Involves subtraction of areas — not shown by this diagram where all regions have positive area and are added.
- Option (B) $a^2 - b^2 = (a + b)(a - b)$: Difference of squares; the diagram shows a sum.
- Option (D) $(a + b)(a - b) = a^2 - b^2$: Same reason as (B).

Final Answer: $(a + b)^2 = a^2 + 2ab + b^2 \Rightarrow \boxed{C}$

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

Q17.

Solution

Concept — Identity $(a + b)^2 = a^2 + 2ab + b^2$: Write $105 = 100 + 5$ to exploit the identity with round numbers.

Step 1 — Identify a and b : $a = 100$, $b = 5$.

Step 2 — Apply the identity:

$$(105)^2 = (100 + 5)^2 = 100^2 + 2 \times 100 \times 5 + 5^2 = 10000 + 1000 + 25 = 11025$$

Why other options are wrong:



- Option (B) 10025: Omitted the middle term $2ab = 1000$ — computed only $100^2 + 5^2 = 10025$.
- Option (C) 11050: Arithmetic error: $10000 + 1025 + 25 = 11050$ (wrong $2ab$).
- Option (D) 10525: Error: used $2 \times 100 \times 5/2 = 500$ giving $10000 + 500 + 25 = 10525$.

Final Answer: $(105)^2 = 11025 \Rightarrow \boxed{A}$

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

Q18.

Solution

Concept — Difference of Squares Identity: $(a + b)(a - b) = a^2 - b^2$.

Step 1 — Recognise the pattern:

$(3x + 5y)(3x - 5y)$ matches $(a + b)(a - b)$ with $a = 3x$ and $b = 5y$.

Step 2 — Apply the identity:

$$(3x + 5y)(3x - 5y) = (3x)^2 - (5y)^2 = 9x^2 - 25y^2$$

Why other options are wrong:

- Option (A) $9x^2 + 25y^2$: Changed the sign of b^2 term — $-b^2$ becomes $+b^2$.
- Option (B) $6x^2 - 25y^2$: Computed $(3x)^2 = 6x^2$ instead of $9x^2$ (squared only the coefficient, not the x).
- Option (C) $9x^2 + 30xy - 25y^2$: Expanded term by term without applying the identity; generated a spurious middle term.

Final Answer: $9x^2 - 25y^2 \Rightarrow \boxed{D}$

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



Q19.

Solution**Concept — Area of a Rhombus:**

$$\text{Area} = \frac{1}{2} \times d_1 \times d_2$$

where d_1 and d_2 are the two diagonals.**Step 1 — Values:** $d_1 = 16$ cm, $d_2 = 12$ cm.**Step 2 — Apply the formula:**

$$\text{Area} = \frac{1}{2} \times 16 \times 12 = \frac{192}{2} = 96 \text{ cm}^2$$

Step 3 — Alternative verification (via triangles):

Diagonals bisect each other perpendicularly: half-diagonals are 8 cm and 6 cm.

$$\text{Area of 4 right triangles} = 4 \times \frac{1}{2} \times 8 \times 6 = 4 \times 24 = 96 \text{ cm}^2 \quad \checkmark$$

Why other options are wrong:

- Option (A) 48 cm^2 : Used half of d_1 with full d_2 : $\frac{1}{2} \times 8 \times 12 = 48$.
- Option (C) 192 cm^2 : Forgot the $\frac{1}{2}$ factor: $d_1 \times d_2 = 16 \times 12 = 192$.
- Option (D) 24 cm^2 : Area of only one of the four triangles: $\frac{1}{2} \times 8 \times 6 = 24$.

Final Answer: Area = $96 \text{ cm}^2 \Rightarrow \boxed{B}$ **Answer: (B)** [Go Back to Q19](#)

Q20.

Solution**Concept — Curved Surface Area of a Cylinder:**

$$\text{CSA} = 2\pi rh$$

Step 1 — Values: $r = 7$ cm, $h = 15$ cm, $\pi = \frac{22}{7}$.**Step 2 — Compute:**

$$\text{CSA} = 2 \times \frac{22}{7} \times 7 \times 15 = 2 \times 22 \times \frac{7}{7} \times 15 = 2 \times 22 \times 1 \times 15 = 2 \times 330 = 660 \text{ cm}^2$$



Why other options are wrong:

- Option (A) 330 cm^2 : Forgot the factor of 2: computed $\pi r h = 330$ only.
- Option (B) 440 cm^2 : Used $h = 10$ instead of $h = 15$: $2 \times \frac{22}{7} \times 7 \times 10 = 440$.
- Option (D) 924 cm^2 : Confused CSA with TSA and used a wrong height: $2\pi r(r + h) \neq 924$ for these values ($2 \times \frac{22}{7} \times 7 \times 22 = 968$).

Final Answer: $\text{CSA} = 660 \text{ cm}^2 \Rightarrow \boxed{C}$

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

Q21.

Solution

Concept — Area of a Circular Ring (Annulus):

$$\text{Area} = \pi(R^2 - r^2)$$

where R = outer radius and r = inner radius.

Step 1 — Values: $R = 10 \text{ cm}$, $r = 4 \text{ cm}$, $\pi = \frac{22}{7}$.

Step 2 — Compute:

$$R^2 - r^2 = 10^2 - 4^2 = 100 - 16 = 84$$

$$\text{Area} = \frac{22}{7} \times 84 = 22 \times \frac{84}{7} = 22 \times 12 = 264 \text{ cm}^2$$

Why other options are wrong:

- Option (B) 314 cm^2 : Used only the outer circle area: $\pi R^2 = \frac{22}{7} \times 100 \approx 314$ (forgot to subtract the inner circle).
- Option (C) 200 cm^2 : Incorrect computation.
- Option (D) 236 cm^2 : Used wrong inner radius ($r = 5$ instead of $r = 4$): $\frac{22}{7}(100 - 25) = \frac{22}{7} \times 75 \approx 236$.

Final Answer: $\text{Area} = 264 \text{ cm}^2 \Rightarrow \boxed{A}$

Answer: (A) [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 the numerator:

$$3^4 \times 3^{-6} = 3^{4+(-6)} = 3^{-2}$$

Step 2 — Simplify the denominator:

$$3^2 \times 3^{-5} = 3^{2+(-5)} = 3^{-3}$$

Step 3 — Divide:

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

Why other options are wrong:

- Option (A) $\frac{1}{3}$: Error — computed 3^{-1} instead of 3^{+1} .
- Option (B) $\frac{1}{9}$: Error — computed 3^{-2} instead of 3^{+1} .
- Option (C) 9: Error — computed 3^2 instead of 3^1 (off by one in the subtraction).

Final Answer: $3 \Rightarrow \boxed{D}$

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

Q23.

Solution

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

Step 1 — Count decimal places:

Move the decimal point **6 places to the right** in 0.0000045 to get 4.5:

$$\underbrace{0.0000045}_{6 \text{ places}} \rightarrow 4.5$$

Step 2 — Write in standard form:

$$0.0000045 = 4.5 \times 10^{-6}$$



Confirm: $1 \leq 4.5 < 10 \checkmark$

Why other options are wrong:

- Option (A) 4.5×10^{-5} : Only 5 places moved; equals $0.000045 \neq 0.0000045$.
- Option (C) 45×10^{-7} : Not standard form since $45 \geq 10$ (requires $m < 10$).
- Option (D) 0.45×10^{-5} : Not standard form since $0.45 < 1$ (requires $m \geq 1$).

Final Answer: $4.5 \times 10^{-6} \Rightarrow \boxed{B}$

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

Q24.

Solution

Concept — Inverse Proportion: More pipes $\Rightarrow$ fewer hours. The product (number of pipes) $\times$ (time) remains constant.

Step 1 — Set up the equation:

Let $p_1 = 4, t_1 = 15, p_2 = 6, t_2 = ?$

$$p_1 \times t_1 = p_2 \times t_2 \Rightarrow 4 \times 15 = 6 \times t_2$$

Step 2 — Solve:

$$t_2 = \frac{60}{6} = 10 \text{ hours}$$

Why other options are wrong:

- Option (A) 6 hours: $6 \times 6 = 36 \neq 60$; also fewer hours than original is too extreme.
- Option (B) 8 hours: $6 \times 8 = 48 \neq 60$.
- Option (D) 12 hours: $6 \times 12 = 72 \neq 60$; also, more pipes should reduce time, not keep it at $>$ original 15 hours.

Final Answer: 6 pipes take 10 hours $\Rightarrow \boxed{C}$

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



Q25.

Solution

Concept — Direct Proportion: More sugar $\Rightarrow$ more cost. The ratio $\frac{\text{cost}}{\text{quantity}}$ is constant.

Step 1 — Find the cost per kg:

$$\text{Rate} = \frac{\text{Rs } 320}{8 \text{ kg}} = \text{Rs } 40 \text{ per kg}$$

Step 2 — Find the cost of 13 kg:

$$\text{Cost} = 40 \times 13 = \text{Rs } 520$$

Step 3 — Verify: $\frac{320}{8} = \frac{520}{13} = 40 \checkmark$

Why other options are wrong:

- Option (B) Rs 480: Implies $\text{Rs } 480 \div 13 \approx 36.9 \text{ per kg} \neq \text{Rs } 40 \text{ per kg}$.
- Option (C) Rs 460: Implies $\text{Rs } 460 \div 13 \approx 35.4 \text{ per kg} \neq \text{Rs } 40 \text{ per kg}$.
- Option (D) Rs 560: Implies $\text{Rs } 560 \div 13 \approx 43.1 \text{ per kg} \neq \text{Rs } 40 \text{ per kg}$ (corresponds to 14 kg at Rs 40).

Final Answer: Cost of 13 kg = Rs 520 $\Rightarrow$ A

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

Q26.

Solution

Concept — Factorisation by Highest Common Factor (HCF): Find the HCF of all terms and factor it out completely.

Step 1 — Find the HCF of all three terms:

$$4x^2y, \quad -8xy^2, \quad 12x^2y^2$$

Numerical HCF of 4, 8, 12: $\text{gcd}(4, 8, 12) = 4$.

Variable HCF: minimum power of x is x^1 ; minimum power of y is y^1 . So variable part = xy .

HCF = $4xy$.



Step 2 — Divide each term by $4xy$ and write:

$$4x^2y - 8xy^2 + 12x^2y^2 = 4xy \left(\frac{4x^2y}{4xy} - \frac{8xy^2}{4xy} + \frac{12x^2y^2}{4xy} \right) = 4xy(x - 2y + 3xy)$$

Step 3 — Verify: $4xy \cdot x = 4x^2y$ ✓, $4xy \cdot (-2y) = -8xy^2$ ✓, $4xy \cdot 3xy = 12x^2y^2$ ✓

Why other options are wrong:

- Option (A) $4x(\dots)$: Factored out $4x$ only — missed y in the HCF.
- Option (B) $4y(\dots)$: Factored out $4y$ only — missed x in the HCF.
- Option (C) $2xy(\dots)$: Factored out only $2xy$ (half the HCF); the inner bracket is not fully simplified.

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

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

Q27.

Solution

Concept — Difference of Squares: $a^2 - b^2 = (a + b)(a - b)$.

Step 1 — Rewrite the expression:

$$25m^2 - 49n^2 = (5m)^2 - (7n)^2$$

This matches $a^2 - b^2$ with $a = 5m$ and $b = 7n$.

Step 2 — Apply the identity:

$$(5m)^2 - (7n)^2 = (5m - 7n)(5m + 7n)$$

Step 3 — Verify: $(5m - 7n)(5m + 7n) = 25m^2 + 35mn - 35mn - 49n^2 = 25m^2 - 49n^2$ ✓

Why other options are wrong:

- Option (A) $(5m + 7n)^2 = 25m^2 + 70mn + 49n^2$: Has a positive $49n^2$ and a middle term; not $25m^2 - 49n^2$.
- Option (C) $(5m - 7n)^2 = 25m^2 - 70mn + 49n^2$: Has $+49n^2$ and a middle term; not $25m^2 - 49n^2$.



- Option (D) $(m - 7n)(m + 7n) = m^2 - 49n^2$: Coefficient of m^2 is 1, not 25.

Final Answer: $(5m - 7n)(5m + 7n) \Rightarrow \boxed{B}$

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

Q28.

Solution

Concept — Factorisation of a Quadratic Trinomial: For $x^2 + bx + c$, find two integers with product = c and sum = b .

Step 1 — Identify the required pair:

Need integers with product = 30 and sum = 11:

Factor pair	Product	Sum
(1, 30)	30	31
(2, 15)	30	17
(3, 10)	30	13
(5, 6)	30	11 ✓

Step 2 — Factorise:

$$x^2 + 11x + 30 = x^2 + 5x + 6x + 30 = x(x + 5) + 6(x + 5) = (x + 5)(x + 6)$$

Step 3 — Verify: $(x + 5)(x + 6) = x^2 + 6x + 5x + 30 = x^2 + 11x + 30$ ✓

Why other options are wrong:

- Option (A) $(x + 3)(x + 10) = x^2 + 13x + 30$: Sum = $3 + 10 = 13 \neq 11$.
- Option (B) $(x + 2)(x + 15) = x^2 + 17x + 30$: Sum = $2 + 15 = 17 \neq 11$.
- Option (D) $(x + 4)(x + 7) = x^2 + 11x + 28$: Sum correct (= 11) but product = $4 \times 7 = 28 \neq 30$.

Final Answer: $(x + 5)(x + 6) \Rightarrow \boxed{C}$

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



Q29.

Solution**Concept — Reading a Bar Chart:** The tallest bar corresponds to the highest score.**Step 1 — Read all scores from the bar chart:**

Student	Score
Aman	72
Bina	85
Chetan	68
Deepa	91
Esha	79

Step 2 — Identify the maximum:The highest score is 91, achieved by **Deepa** (the tallest bar in the chart).**Why other options are wrong:**

- Option (A) Aman: Score = 72 — lower than Bina (85), Deepa (91), and Esha (79).
- Option (B) Bina: Score = 85 — second highest but less than Deepa's 91.
- Option (C) Esha: Score = 79 — middle value; not the highest.

Final Answer: Deepa (score = 91) $\Rightarrow$ DAnswer: (D) [Go Back to Q29](#)

Q30.

Solution**Concept — Classical Probability:**

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

Step 1 — Count the total number of balls:

$$\text{Total} = 6 \text{ (red)} + 4 \text{ (blue)} + 2 \text{ (green)} = 12 \text{ balls}$$

Step 2 — Count the favourable outcomes (green balls):

$$n(\text{green}) = 2$$



Step 3 — Compute the probability:

$$P(\text{green}) = \frac{2}{12} = \frac{1}{6}$$

Why other options are wrong:

- Option (B) $\frac{1}{3} = \frac{4}{12}$ — probability of drawing a *blue* ball.
- Option (C) $\frac{1}{2} = \frac{6}{12}$ — probability of drawing a *red* ball.
- Option (D) $\frac{2}{3} = \frac{8}{12}$ — probability of drawing a red *or* blue ball (non-green).

Final Answer: $P(\text{green}) = \frac{1}{6} \Rightarrow \boxed{A}$

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



Answer Key

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

