

SHRESHTA NETS Mathematics

Sample Paper – 2

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. Simplify: $\frac{-7}{12} + \frac{5}{18}$.

- (A) $\frac{-3}{4}$
- (B) $\frac{-1}{12}$
- (C) $\frac{11}{36}$
- (D) $\frac{-11}{36}$

Q2. Between which two consecutive integers does $\frac{-7}{5}$ lie?

- (A) Between -1 and 0
- (B) Between -2 and -1
- (C) Between -3 and -2
- (D) Between 0 and 1



Q3. Solve for y : $5y - 8 = 3y + 4$.

- (A) 6
- (B) 4
- (C) 2
- (D) 8

Q4. Divide 84 into two parts such that one part is 12 more than the other. What is the larger part?

- (A) 36
- (B) 40
- (C) 44
- (D) 48

Q5. Solve: $\frac{3(x-1)}{4} = \frac{2(x+1)}{3}$.

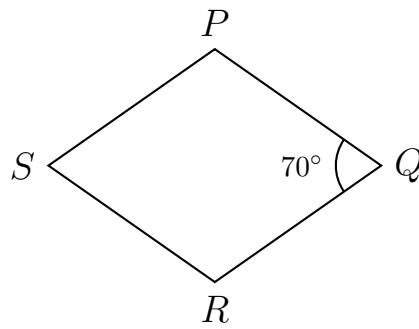
- (A) 15
- (B) 17
- (C) 19
- (D) 21

Q6. The angles of a quadrilateral are in the ratio 2 : 3 : 4 : 6. Find the largest angle.

- (A) 120°
- (B) 128°
- (C) 136°
- (D) 144°

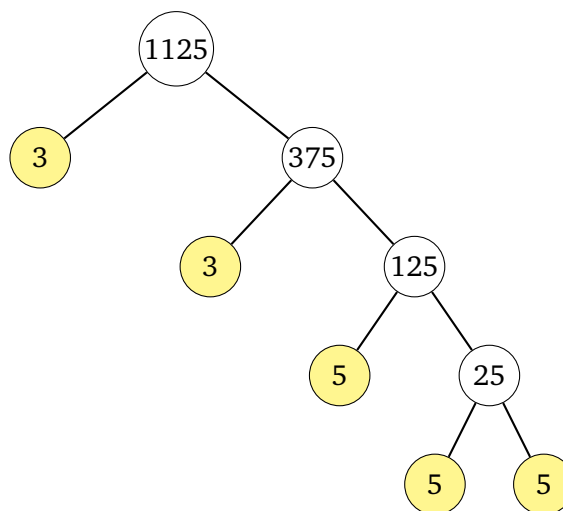
Q7. In the rhombus $PQRS$ shown below, $\angle PQR = 70^\circ$. Find $\angle QRS$.





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

Q8. The prime factor tree for 1125 is shown below. What is the smallest number by which 1125 must be multiplied to obtain a perfect square?



$$\therefore 1125 = 3^2 \times 5^3$$

- (A) 3
- (B) 5
- (C) 7
- (D) 25

Q9. Find $\sqrt{3136}$ by prime factorisation.

- (A) 52
- (B) 54



(C) 56

(D) 58

Q10. Using the formula for Pythagorean triplets $(2m, m^2 - 1, m^2 + 1)$ with $m = 4$, identify the correct triplet.

(A) (8, 15, 17)

(B) (6, 8, 10)

(C) (8, 12, 16)

(D) (5, 12, 13)

Q11. Which of the following numbers is a perfect cube?

(A) 216

(B) 392

(C) 450

(D) 500

Q12. Find $\sqrt[3]{15625}$.

(A) 20

(B) 25

(C) 30

(D) 35

Q13. A trader sold an article for Rs 864 at a loss of 4%. Find the cost price.

(A) Rs 820

(B) Rs 850

(C) Rs 880

(D) Rs 900

Q14. Find the compound interest on Rs 8000 at 10% per annum for 2 years, compounded annually.



- (A) Rs 1600
- (B) Rs 1680
- (C) Rs 1700
- (D) Rs 1760

Q15. A GST of 12% is levied on an article priced at Rs 2400. Find the total amount to be paid.

- (A) Rs 2400
- (B) Rs 2500
- (C) Rs 2688
- (D) Rs 2760

Q16. Add the expressions $(4a^2 - 3b + 5c)$ and $(-2a^2 + 6b - 2c)$.

- (A) $2a^2 + 3b - 3c$
- (B) $2a^2 + 3b + 3c$
- (C) $6a^2 + 3b + 3c$
- (D) $2a^2 - 3b + 3c$

Q17. Using the identity $(a + b)^2 = a^2 + 2ab + b^2$, find the value of $(103)^2$.

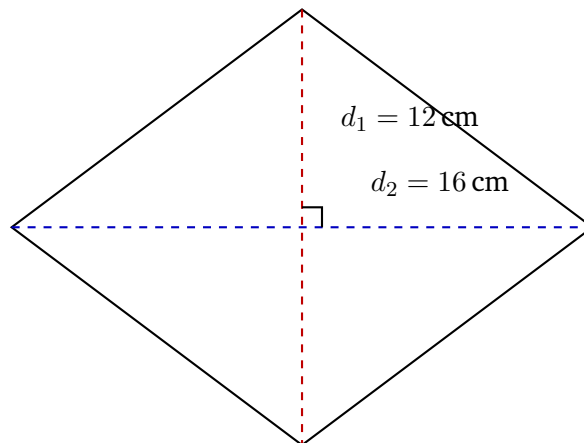
- (A) 10609
- (B) 10600
- (C) 10690
- (D) 10906

Q18. Expand $(2a - 5b)^2$.

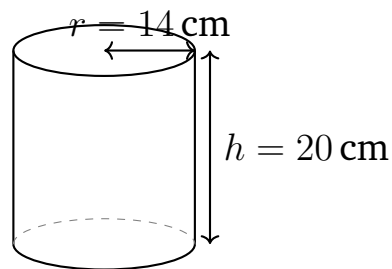
- (A) $4a^2 + 20ab + 25b^2$
- (B) $4a^2 - 10ab + 25b^2$
- (C) $4a^2 - 20ab + 10b^2$
- (D) $4a^2 - 20ab + 25b^2$



- Q19.** Find the area of the rhombus shown below, whose diagonals measure $d_1 = 12$ cm and $d_2 = 16$ cm.



- (A) 48 cm^2
(B) 96 cm^2
(C) 108 cm^2
(D) 192 cm^2
- Q20.** Find the lateral surface area of the cylinder shown below with radius $r = 14$ cm and height $h = 20$ cm. (Use $\pi = \frac{22}{7}$)



- (A) 880 cm^2
(B) 1232 cm^2
(C) 1540 cm^2
(D) 1760 cm^2
- Q21.** Find the volume of a cuboid measuring $15 \text{ cm} \times 6 \text{ cm} \times 4 \text{ cm}$.

- (A) 200 cm^3
(B) 300 cm^3



(C) 360 cm^3

(D) 420 cm^3

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

(A) 5

(B) 25

(C) $\frac{1}{5}$

(D) $\frac{1}{25}$

Q23. Express 0.00000785 in standard form.

(A) 7.85×10^{-5}

(B) 7.85×10^{-6}

(C) 7.85×10^{-7}

(D) 78.5×10^{-7}

Q24. A train travels 840 km in 7 hours at uniform speed. How far does it travel in 5 hours at the same speed? (Direct proportion)

(A) 480 km

(B) 525 km

(C) 560 km

(D) 600 km

Q25. 20 workers can finish a job in 15 days. How many workers are needed to finish the same job in 12 days? (Inverse proportion)

(A) 16

(B) 20

(C) 25

(D) 30

Q26. Factorise: $14pq + 21p^2q - 7pq^2$.



- (A) $7p(2q + 3p - q^2)$
- (B) $7pq(2 + 3p - q)$
- (C) $7pq(2 - 3p + q)$
- (D) $7p^2q(2 + 3p - q)$

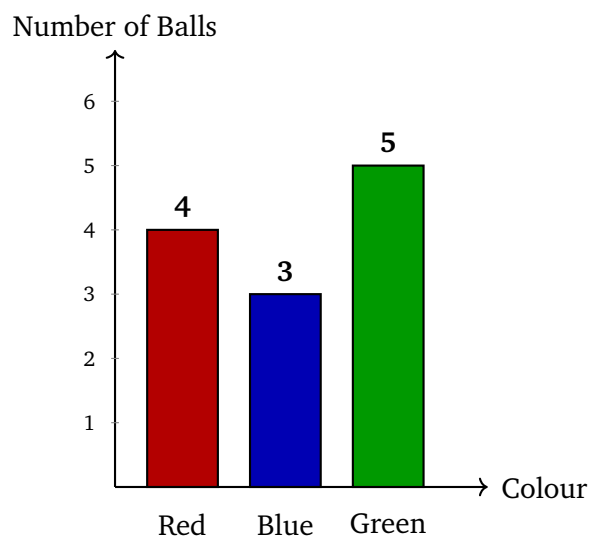
Q27. Factorise: $4y^2 + 12y + 9$.

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

Q28. Divide $(x^2 + 9x + 20)$ by $(x + 4)$. Find the quotient.

- (A) $x + 4$
- (B) $x + 3$
- (C) $x + 5$
- (D) $x + 6$

Q29. A bag contains 4 red, 3 blue, and 5 green balls. The bar chart below shows the counts. One ball is drawn at random. What is the probability of drawing a **red** ball?

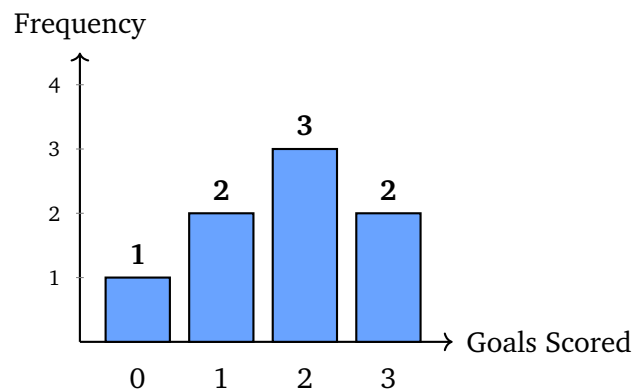


- (A) $\frac{1}{3}$



- (B) $\frac{1}{4}$
(C) $\frac{5}{12}$
(D) $\frac{1}{6}$

Q30. The number of goals scored in 8 football matches are: 2, 3, 1, 0, 2, 3, 2, 1.
The frequency chart is shown below. Find the **mode**.



- (A) 1
(B) 2
(C) 3
(D) 0



Detailed Solutions

Solution

Concept: To add rational numbers with unlike denominators, find the Least Common Denominator (LCD) and convert each fraction.

Step 1 — Find LCD of 12 and 18. $12 = 2^2 \times 3$, $18 = 2 \times 3^2$. $\text{LCD} = 2^2 \times 3^2 = 36$.

Step 2 — Convert and add.

$$\frac{-7}{12} = \frac{-7 \times 3}{36} = \frac{-21}{36}, \quad \frac{5}{18} = \frac{5 \times 2}{36} = \frac{10}{36}$$

$$\frac{-21}{36} + \frac{10}{36} = \frac{-21 + 10}{36} = \frac{-11}{36}$$

Why other options are wrong:

- Q1.**
- (A) $-\frac{3}{4}$: uses incorrect LCD or wrong conversion.
 - (B) $-\frac{1}{12}$: subtracts numerators over original denominator incorrectly.
 - (C) $\frac{11}{36}$: correct magnitude but wrong sign (ignores the negative on $-7/12$).

Final Answer: $\frac{-11}{36}$

Answer: (D)

Solution

Concept: Convert the rational number to a decimal to identify its position on the number line.

Step 1 — Convert to decimal.

$$\frac{-7}{5} = -1.4$$

Step 2 — Locate between integers. $-2 < -1.4 < -1$, so $\frac{-7}{5}$ lies between -2 and -1 .

Why other options are wrong:

- Q2.**
- (A) Between -1 and 0 : $-1.4 < -1$, so it is to the left of -1 .
 - (C) Between -3 and -2 : $-1.4 > -2$, so it does not reach -2 .
 - (D) Between 0 and 1 : the number is negative.

Final Answer: -2 and -1

Answer: (B)



Solution

Concept: Solve a linear equation in one variable by transposing terms.

Step 1 — Transpose y -terms to the left and constants to the right.

$$5y - 8 = 3y + 4 \implies 5y - 3y = 4 + 8 \implies 2y = 12$$

Step 2 — Divide both sides by 2.

$$y = \frac{12}{2} = 6$$

Verification: $5(6) - 8 = 22 = 3(6) + 4$. ✓

Why other options are wrong:

- Q3.**
- (B) $y = 4$: $5(4) - 8 = 12 \neq 3(4) + 4 = 16$.
 - (C) $y = 2$: $5(2) - 8 = 2 \neq 3(2) + 4 = 10$.
 - (D) $y = 8$: $5(8) - 8 = 32 \neq 3(8) + 4 = 28$.

Final Answer: $y = 6$

Answer: (A)

Solution

Concept: Formulate and solve a linear equation from a word problem.

Step 1 — Set up the equation. Let the smaller part = x . Then the larger part = $x + 12$.

$$x + (x + 12) = 84 \implies 2x + 12 = 84 \implies 2x = 72 \implies x = 36$$

Step 2 — Find the larger part.

$$\text{Larger part} = 36 + 12 = 48$$

Why other options are wrong:

- Q4.**
- (A) 36: this is the *smaller* part, not the larger.
 - (B) 40, (C) 44: neither gives a sum of 84 when paired with a value 12 less.

Final Answer: 48

Answer: (D)



Solution

Concept: Solve a linear equation involving fractions by cross-multiplication.

Step 1 — Cross-multiply.

$$\frac{3(x-1)}{4} = \frac{2(x+1)}{3} \implies 3 \times 3(x-1) = 4 \times 2(x+1)$$

$$9(x-1) = 8(x+1)$$

Step 2 — Expand and solve.

$$9x - 9 = 8x + 8 \implies 9x - 8x = 8 + 9 \implies x = 17$$

Verification: LHS = $\frac{3 \times 16}{4} = 12$; RHS = $\frac{2 \times 18}{3} = 12$. ✓

Why other options are wrong:

- Q5.**
- (A) $x = 15$: gives LHS = $\frac{42}{4} = 10.5$, RHS = $\frac{32}{3} \approx 10.67$. Not equal.
 - (C) $x = 19$, (D) $x = 21$: substitution does not satisfy the equation.

Final Answer: $x = 17$

Answer: (B)

Solution

Concept: The sum of all interior angles of a quadrilateral is 360° .

Step 1 — Find the scale factor. Let the common ratio factor be k .

$$2k + 3k + 4k + 6k = 360^\circ \implies 15k = 360^\circ \implies k = 24^\circ$$

Step 2 — Find the largest angle.

$$\text{Largest angle} = 6k = 6 \times 24^\circ = 144^\circ$$

Why other options are wrong:

- Q6.**
- (A) $120^\circ = 5 \times 24^\circ$: corresponds to ratio 5, not the largest ratio (6).
 - (B) 128° , (C) 136° : not multiples of 24° .

Final Answer: 144°

Answer: (D)



Solution

Concept: In a rhombus, adjacent angles are supplementary (they add up to 180°). This follows from the fact that a rhombus is a parallelogram.

Step 1 — Apply the supplementary angle property. $\angle PQR$ and $\angle QRS$ are adjacent angles in rhombus $PQRS$.

$$\angle PQR + \angle QRS = 180^\circ$$

Step 2 — Substitute and solve.

$$70^\circ + \angle QRS = 180^\circ \implies \angle QRS = 180^\circ - 70^\circ = 110^\circ$$

Why other options are wrong:

- Q7.**
- (B) 70° : $\angle QRS = \angle PQR$ only if the rhombus is a square (all 90°). Opposite angles are equal, not adjacent ones.
 - (C) 90° : only true for a square.
 - (D) 120° : $70^\circ + 120^\circ = 190^\circ \neq 180^\circ$.

Final Answer: 110°

Answer: (A)

Solution

Concept: For a number to be a perfect square, every prime factor must appear an *even* number of times in its prime factorisation.

Step 1 — Read the factor tree.

$$1125 = 3^2 \times 5^3$$

Step 2 — Identify unpaired factors. 3^2 is already a perfect square (even exponent). 5^3 has an odd exponent, so one more factor of 5 is needed to make 5^4 .

Step 3 — Conclusion. Multiply 1125 by 5:

$$1125 \times 5 = 5625 = 3^2 \times 5^4 = (3 \times 5^2)^2 = 75^2. \quad \checkmark$$

Why other options are wrong:

- Q8.**
- (A) 3: $1125 \times 3 = 3375 = 3^3 \times 5^3$; both exponents are odd — not a perfect square.
 - (C) 7: introduces a new prime 7; 1125×7 is not a perfect square.
 - (D) 25: $1125 \times 25 = 28125 = 3^2 \times 5^5$; exponent of 5 still odd.



Final Answer: 5

Answer: (B)

Solution

Concept: $\sqrt{n}$ by prime factorisation — pair up identical prime factors.

Step 1 — Prime factorisation of 3136.

$$3136 = 2^6 \times 7^2$$

(Successive divisions: $3136 \div 2 = 1568 \div 2 = 784 \div 2 = 392 \div 2 = 196 \div 2 = 98 \div 2 = 49 = 7^2$.)

Step 2 — Take the square root.

$$\sqrt{3136} = \sqrt{2^6 \times 7^2} = 2^3 \times 7 = 8 \times 7 = 56$$

Verification: $56^2 = 3136$. ✓

Why other options are wrong:

- Q9.**
- (A) 52: $52^2 = 2704 \neq 3136$.
 - (B) 54: $54^2 = 2916 \neq 3136$.
 - (D) 58: $58^2 = 3364 \neq 3136$.

Final Answer: 56

Answer: (C)

Solution

Concept: For any integer $m > 1$, the set $(2m, m^2 - 1, m^2 + 1)$ forms a Pythagorean triplet.

Step 1 — Substitute $m = 4$.

$$2m = 2 \times 4 = 8, \quad m^2 - 1 = 16 - 1 = 15, \quad m^2 + 1 = 16 + 1 = 17$$

Step 2 — Verify the Pythagorean property.

$$8^2 + 15^2 = 64 + 225 = 289 = 17^2 \quad \checkmark$$

Why other options are wrong:

- Q10.**
- (B) (6, 8, 10): corresponds to $m = 3$ ($2 \times 3 = 6$, $3^2 - 1 = 8$, $3^2 + 1 = 10$), not $m = 4$.



- (C) (8, 12, 16): $8^2 + 12^2 = 64 + 144 = 208 \neq 256 = 16^2$.
- (D) (5, 12, 13): a valid Pythagorean triplet but comes from formula $m = 3$ using a different parameterisation, not $m = 4$ here.

Final Answer: (8, 15, 17)

Answer: (A)

Q11.

Solution

Concept: A perfect cube is a number that equals the cube of some integer. Check by prime factorisation — all exponents must be multiples of 3.

Step 1 — Check each option.

$$216 = 2^3 \times 3^3 = 6^3 \quad \checkmark$$

$$392 = 2^3 \times 7^2 \quad (\text{exponent of 7 is 2, not a multiple of 3 — not a perfect cube})$$

$$450 = 2 \times 3^2 \times 5^2 \quad (\text{no exponent is a multiple of 3 — not a perfect cube})$$

$$500 = 2^2 \times 5^3 \quad (\text{exponent of 2 is 2, not a multiple of 3 — not a perfect cube})$$

Final Answer: $216 = 6^3$

Answer: (A)

Solution

Concept: Find cube root by prime factorisation — group prime factors in triplets.

Step 1 — Factorise 15625.

$$15625 = 5^6 \quad (\text{since } 5^6 = 15625)$$

(Verify: $5^1 = 5$, $5^2 = 25$, $5^3 = 125$, $5^4 = 625$, $5^5 = 3125$, $5^6 = 15625$.)

Step 2 — Cube root.

$$\sqrt[3]{15625} = \sqrt[3]{5^6} = 5^{6/3} = 5^2 = 25$$

Verification: $25^3 = 15625$. $\checkmark$

Why other options are wrong:

- Q12.**
- (A) 20: $20^3 = 8000 \neq 15625$.
 - (C) 30: $30^3 = 27000 \neq 15625$.
 - (D) 35: $35^3 = 42875 \neq 15625$.



Final Answer: 25

Answer: (B)

Solution

Concept: When an article is sold at a loss, $SP = CP \times (1 - \text{Loss}\%/100)$.

Step 1 — Write the formula.

$$CP = \frac{SP}{1 - \text{Loss}\%/100} = \frac{864}{1 - 0.04} = \frac{864}{0.96}$$

Step 2 — Calculate.

$$CP = \frac{864}{0.96} = \frac{864 \times 100}{96} = \frac{86400}{96} = 900$$

Verification: 4% of 900 = 36. $SP = 900 - 36 = 864$. ✓

Why other options are wrong:

- Q13.**
- (A) Rs 820: 4% of 820 = 32.8; $SP = 787.2 \neq 864$.
 - (B) Rs 850: 4% of 850 = 34; $SP = 816 \neq 864$.
 - (C) Rs 880: 4% of 880 = 35.2; $SP = 844.8 \neq 864$.

Final Answer: Rs 900

Answer: (D)

Solution

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

Step 1 — Find Amount.

$$A = 8000 \times \left(1 + \frac{10}{100}\right)^2 = 8000 \times (1.1)^2 = 8000 \times 1.21 = 9680$$

Step 2 — Find CI.

$$CI = A - P = 9680 - 8000 = 1680$$

Why other options are wrong:

- Q14.**
- (A) Rs 1600: this is the simple interest ($8000 \times 10\% \times 2 = 1600$), not compound interest.
 - (C) Rs 1700: incorrect computation.
 - (D) Rs 1760: $8000 \times 0.22 = 1760$ (using $1.1^2 = 1.22$ incorrectly).



Final Answer: Rs 1680

Answer: (B)

Solution

Concept: GST (Goods and Services Tax) is levied on the marked price. Total amount = Marked price + GST.

Step 1 — Compute GST.

$$\text{GST} = 12\% \times 2400 = \frac{12}{100} \times 2400 = 288$$

Step 2 — Total amount.

$$\text{Total} = 2400 + 288 = 2688$$

Why other options are wrong:

- Q15.**
- (A) Rs 2400: the original price without GST.
 - (B) Rs 2500: uses wrong GST base or wrong rate.
 - (D) Rs 2760: 15% of 2400 = 360; total = 2760 (applies 15% instead of 12%).

Final Answer: Rs 2688

Answer: (C)

Solution

Concept: Add algebraic expressions by collecting like terms (terms with the same variable and exponent).

Step 1 — Write the sum.

$$(4a^2 - 3b + 5c) + (-2a^2 + 6b - 2c)$$

Step 2 — Collect like terms.

$$a^2\text{-terms : } 4a^2 + (-2a^2) = 2a^2$$

$$b\text{-terms : } -3b + 6b = +3b$$

$$c\text{-terms : } 5c + (-2c) = +3c$$

$$\text{Result} = 2a^2 + 3b + 3c$$

Why other options are wrong:



- Q16.**
- (A) $2a^2 + 3b - 3c$: wrong sign on c (treats $5c - 2c$ as $-3c$).
 - (C) $6a^2 + 3b + 3c$: adds $4 + 2 = 6$ instead of $4 - 2 = 2$ for the a^2 coefficient.
 - (D) $2a^2 - 3b + 3c$: wrong sign on b (subtracts instead of adds).

Final Answer: $2a^2 + 3b + 3c$

Answer: (B)

Solution

Concept: Use the algebraic identity $(a + b)^2 = a^2 + 2ab + b^2$ to avoid direct multiplication.

Step 1 — Express 103 as $(100 + 3)$.

$$(103)^2 = (100 + 3)^2$$

Step 2 — Apply the identity.

$$= (100)^2 + 2 \times 100 \times 3 + (3)^2 = 10000 + 600 + 9 = 10609$$

Why other options are wrong:

- Q17.**
- (B) 10600: omits the $3^2 = 9$ term.
 - (C) 10690: incorrect addition of partial products.
 - (D) 10906: digits transposed in the result.

Final Answer: 10609

Answer: (A)

Solution

Concept: Use the identity $(a - b)^2 = a^2 - 2ab + b^2$.

Step 1 — Identify a and b . $a = 2a$, $b = 5b$ (using a and b from the identity matching $2a$ and $5b$ in the expression).

Step 2 — Apply the identity.

$$(2a - 5b)^2 = (2a)^2 - 2(2a)(5b) + (5b)^2 = 4a^2 - 20ab + 25b^2$$

Why other options are wrong:

- Q18.**
- (A) $4a^2 + 20ab + 25b^2$: uses $(a + b)^2$ instead of $(a - b)^2$; sign of the middle term is wrong.
 - (B) $4a^2 - 10ab + 25b^2$: the middle term should be $2(2a)(5b) = 20ab$, not $10ab$.



- (C) $4a^2 - 20ab + 10b^2$: $(5b)^2 = 25b^2$, not $10b^2$.

Final Answer: $4a^2 - 20ab + 25b^2$

Answer: (D)

Solution

Concept: Area of a rhombus $= \frac{1}{2} \times d_1 \times d_2$, where d_1 and d_2 are the diagonals.

Step 1 — Identify the diagonals. $d_1 = 12$ cm, $d_2 = 16$ cm.

Step 2 — Apply the formula.

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

Why other options are wrong:

- Q19.**
- (A) 48 cm^2 : uses $\frac{1}{4} \times d_1 \times d_2$ (forgot to multiply by 2 correctly, applying formula once per half-diagonal).
 - (C) 108 cm^2 : incorrect computation.
 - (D) 192 cm^2 : omits the factor of $\frac{1}{2}$ — this is $d_1 \times d_2$, not the area.

Final Answer: 96 cm^2

Answer: (B)

Solution

Concept: Lateral (Curved) Surface Area of a cylinder $= 2\pi rh$.

Step 1 — Write known values. $r = 14$ cm, $h = 20$ cm, $\pi = \frac{22}{7}$.

Step 2 — Substitute.

$$\text{LSA} = 2 \times \frac{22}{7} \times 14 \times 20$$

Step 3 — Simplify.

$$= 2 \times \frac{22}{7} \times 7 \times 2 \times 20 = 2 \times 22 \times 2 \times 20 = 4 \times 22 \times 20 = 88 \times 20 = 1760 \text{ cm}^2$$

Why other options are wrong:

- Q20.**
- (A) 880 cm^2 : uses πrh (omits factor of 2).
 - (B) 1232 cm^2 : likely uses wrong cancellation ($\pi = 22/7$, $r = 14/2 = 7$, missing a factor).
 - (C) 1540 cm^2 : uses $h = 17.5$ or similar incorrect value.

Final Answer: 1760 cm^2



Answer: (D)

Solution**Concept:** Volume of a cuboid = $l \times b \times h$.**Step 1 — Identify dimensions.** $l = 15$ cm, $b = 6$ cm, $h = 4$ cm.**Step 2 — Calculate.**

$$V = 15 \times 6 \times 4 = 90 \times 4 = 360 \text{ cm}^3$$

Why other options are wrong:

- Q21.**
- (A) 200 cm^3 : incorrect partial product ($15 \times 6 = 90$, not used).
 - (B) 300 cm^3 : uses $15 \times 4 \times 5$ or similar wrong combination.
 - (D) 420 cm^3 : likely uses one incorrect dimension.

Final Answer: 360 cm^3

Answer: (C)

Solution**Concept:** Laws of exponents: $a^m \times a^n = a^{m+n}$; $\frac{a^m}{a^n} = a^{m-n}$.**Step 1 — Simplify the numerator.**

$$5^2 \times 5^{-4} = 5^{2+(-4)} = 5^{-2}$$

Step 2 — Divide by 5^{-3} .

$$\frac{5^{-2}}{5^{-3}} = 5^{-2-(-3)} = 5^{-2+3} = 5^1 = 5$$

Why other options are wrong:

- Q22.**
- (B) $25 = 5^2$: incorrect exponent arithmetic ($2 - 4 + 3 = 1$, not 2).
 - (C) $\frac{1}{5} = 5^{-1}$: sign error in denominator step.
 - (D) $\frac{1}{25} = 5^{-2}$: stops after the numerator without dividing by 5^{-3} .

Final Answer: 5

Answer: (A)

Solution**Concept:** Standard form (scientific notation): $a \times 10^n$, where $1 \leq a < 10$.**Step 1 — Count decimal places.** 0.00000785: the decimal point must move **6** places to the right to get 7.85.

Step 2 — Write in standard form.

$$0.00000785 = 7.85 \times 10^{-6}$$

Why other options are wrong:

- Q23.**
- (A) 7.85×10^{-5} : only 5 zeros after the decimal; actual count is 6.
 - (C) 7.85×10^{-7} : one too many places counted.
 - (D) 78.5×10^{-7} : 78.5 is not in the range $[1, 10)$, so this is not standard form.

Final Answer: 7.85×10^{-6}

Answer: (B)

Solution

Concept: In direct proportion, if x increases, y increases proportionally: $\frac{x_1}{y_1} = \frac{x_2}{y_2}$.

Step 1 — Find the speed (or use direct proportion ratio).

$$\frac{840 \text{ km}}{7 \text{ h}} = \frac{d}{5 \text{ h}}$$

Step 2 — Solve for d .

$$d = \frac{840 \times 5}{7} = \frac{4200}{7} = 600 \text{ km}$$

Why other options are wrong:

- Q24.**
- (A) 480 km: corresponds to 4 hours (120×4), not 5 hours.
 - (B) 525 km: incorrect ratio computation.
 - (C) 560 km: based on wrong speed (e.g., $840 \div 7.5$).

Final Answer: 600 km

Answer: (D)

Solution

Concept: In inverse proportion, $\text{Workers} \times \text{Days} = \text{constant}$.

Step 1 — Set up the equation.

$$20 \times 15 = W \times 12$$



Step 2 — Solve for W .

$$W = \frac{20 \times 15}{12} = \frac{300}{12} = 25$$

Why other options are wrong:

- Q25.**
- (A) 16: applies direct proportion ($\frac{20 \times 12}{15} = 16$) instead of inverse proportion.
 - (B) 20: the original number of workers; finishing in fewer days requires more workers.
 - (D) 30: $20 \times 15 \div 10 = 30$, using 10 days instead of 12.

Final Answer: 25 workers

Answer: (C)

Solution

Concept: Factorise by taking out the Highest Common Factor (HCF) of all terms.

Step 1 — Find HCF of $14pq$, $21p^2q$, $7pq^2$.

Coefficients: $\gcd(14, 21, 7) = 7$

Variable p : p^1 (lowest power)

Variable q : q^1 (lowest power)

HCF = $7pq$.

Step 2 — Divide each term by HCF.

$$14pq \div 7pq = 2, \quad 21p^2q \div 7pq = 3p, \quad 7pq^2 \div 7pq = q$$

$$14pq + 21p^2q - 7pq^2 = 7pq(2 + 3p - q)$$

Why other options are wrong:

- Q26.**
- (A) $7p(2q + 3p - q^2)$: takes HCF as $7p$ — not the full HCF (q is not factored out).
 - (C) $7pq(2 - 3p + q)$: wrong signs on $3p$ and q .
 - (D) $7p^2q(2 + 3p - q)$: over-factors; $7p^2q$ does not divide $14pq$.

Final Answer: $7pq(2 + 3p - q)$

Answer: (B)



Solution

Concept: Recognise the perfect square trinomial pattern $(a + b)^2 = a^2 + 2ab + b^2$.

Step 1 — Match the pattern.

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

Here $a = 2y$ and $b = 3$.

Step 2 — Write as a square.

$$= (2y + 3)^2$$

Why other options are wrong:

- Q27.**
- (A) $(2y - 3)^2 = 4y^2 - 12y + 9$: wrong sign on the middle term.
 - (B) $(y + 3)^2 = y^2 + 6y + 9$: wrong leading coefficient (y^2 , not $4y^2$).
 - (C) $4(y + 3)^2 = 4y^2 + 24y + 36$: the middle and last terms don't match.

Final Answer: $(2y + 3)^2$

Answer: (D)

Solution

Concept: Divide a polynomial by a linear expression using factorisation or long division.

Step 1 — Factorise the numerator. Find two numbers that multiply to 20 and add to 9: they are 4 and 5.

$$x^2 + 9x + 20 = (x + 4)(x + 5)$$

Step 2 — Divide.

$$\frac{(x + 4)(x + 5)}{(x + 4)} = x + 5 \quad (x \neq -4)$$

Why other options are wrong:

- Q28.**
- (A) $x + 4$: would mean $(x + 4)^2 = x^2 + 8x + 16 \neq x^2 + 9x + 20$.
 - (B) $x + 3$: would mean $(x + 4)(x + 3) = x^2 + 7x + 12 \neq x^2 + 9x + 20$.
 - (D) $x + 6$: would mean $(x + 4)(x + 6) = x^2 + 10x + 24 \neq x^2 + 9x + 20$.

Final Answer: $x + 5$

Answer: (C)



Solution

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

Step 1 — Count total balls.

$$\text{Total} = 4 (\text{red}) + 3 (\text{blue}) + 5 (\text{green}) = 12$$

Step 2 — Find probability of red.

$$P(\text{red}) = \frac{4}{12} = \frac{1}{3}$$

Why other options are wrong:

- Q29.**
- (B) $\frac{1}{4}$: equivalent to $\frac{3}{12}$, which is the probability for blue balls.
 - (C) $\frac{5}{12}$: this is the probability of drawing a green ball.
 - (D) $\frac{1}{6} = \frac{2}{12}$: not the count of any colour here.

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

Answer: (A)

Solution

Concept: The **mode** is the value that appears most frequently in a data set.

Step 1 — Organise the data.

Data: 2, 3, 1, 0, 2, 3, 2, 1.

Q30.

Goals Scored	Frequency
0	1
1	2
2	3
3	2

Step 2 — Identify highest frequency. Goals scored = 2 appears **3 times** (highest frequency). Hence, mode = 2.

Why other options are wrong:

- (A) 1: appears only 2 times — not the highest frequency.
- (C) 3: also appears 2 times — tied with 1, but neither beats 2's count of 3.
- (D) 0: appears only once.

Final Answer: $\boxed{2}$

Answer: (B)



Answer Key

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

