

SHRESHTA NETS Mathematics

Sample Paper – 4

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. What is the multiplicative inverse (reciprocal) of $\frac{-4}{7}$?

- (A) $\frac{7}{4}$
- (B) $\frac{-7}{4}$
- (C) $\frac{4}{7}$
- (D) $\frac{-4}{7}$

Q2. Which property is illustrated by the following?

$$\left(\frac{-2}{3}\right) \times \left(\frac{1}{2} + \frac{1}{4}\right) = \left(\frac{-2}{3}\right) \times \frac{1}{2} + \left(\frac{-2}{3}\right) \times \frac{1}{4}$$

- (A) Commutative Property
- (B) Associative Property
- (C) Distributive Property



(D) Closure Property

Q3. Solve for p : $4p + 3 = 2p + 11$

(A) $p = 2$

(B) $p = 3$

(C) $p = 4$

(D) $p = 5$

Q4. The sum of two numbers is 48 and their difference is 16. Find the larger number.

(A) 24

(B) 32

(C) 36

(D) 40

Q5. Solve: $\frac{x}{3} - \frac{x-2}{4} = \frac{5}{12}$

(A) $x = 1$

(B) $x = 2$

(C) $x = -1$

(D) $x = -2$

Q6. Two angles of a quadrilateral are 80 and 120. The remaining two angles are equal. Find the measure of each equal angle.

(A) 80

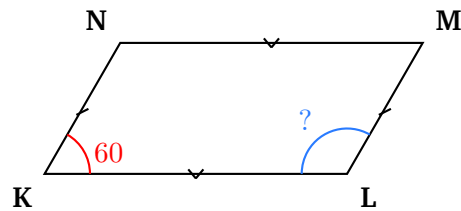
(B) 70

(C) 90

(D) 100

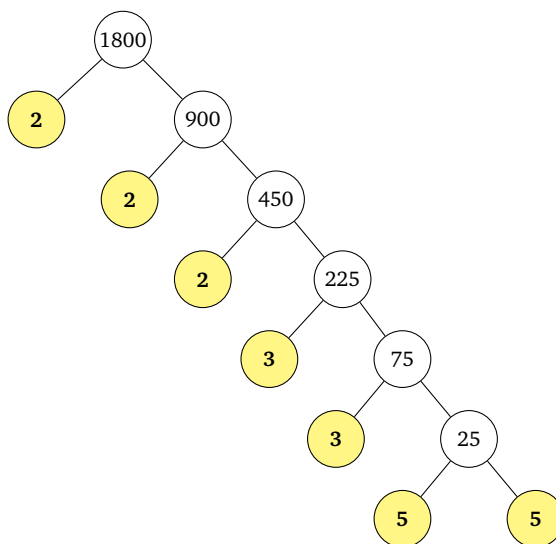
Q7. In the parallelogram $KLMN$ shown below, $\angle K = 60$. Find $\angle L$.





- (A) 60
- (B) 120
- (C) 90
- (D) 150

Q8. Find the smallest positive integer by which 1800 must be multiplied to obtain a perfect square. The prime factor tree is shown below.



$$1800 = 2^3 \times 3^2 \times 5^2$$

- (A) 3
- (B) 5
- (C) 6
- (D) 2

Q9. Find $\sqrt{5184}$ using the long-division method.

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



(D) 78

Q10. Using the formula $(2m, m^2 - 1, m^2 + 1)$ with $m = 6$, which of the following is a Pythagorean triplet?

(A) (10, 24, 26)

(B) (12, 35, 37)

(C) (8, 15, 17)

(D) (5, 12, 13)

Q11. The value of $\sqrt[3]{5832}$ is:

(A) 16

(B) 14

(C) 20

(D) 18

Q12. Find $\sqrt[3]{19683}$.

(A) 23

(B) 25

(C) 27

(D) 29

Q13. A mobile phone is purchased for Rs 12,000 and sold for Rs 10,200. Find the loss percentage.

(A) 10%

(B) 15%

(C) 12%

(D) 20%

Q14. Find the compound interest on Rs 6,000 at 10% per annum for 2 years, compounded annually.



- (A) Rs 1,200
- (B) Rs 1,100
- (C) Rs 1,260
- (D) Rs 1,320

Q15. A coat with a marked price of Rs 2,800 is available at a 25% discount. Find the sale price.

- (A) Rs 2,100
- (B) Rs 2,000
- (C) Rs 2,200
- (D) Rs 1,800

Q16. Find the product $(3m - 2n)(3m + 2n)$.

- (A) $9m^2 + 4n^2$
- (B) $6m^2 - 4n^2$
- (C) $9m^2 - 4n^2$
- (D) $3m^2 - 2n^2$

Q17. Using the identity $(a - b)^2 = a^2 - 2ab + b^2$, find the value of $(98)^2$.

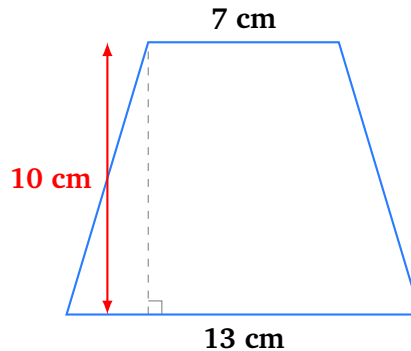
- (A) 9506
- (B) 9800
- (C) 9801
- (D) 9604

Q18. Expand $(x + 3)(x - 5)$.

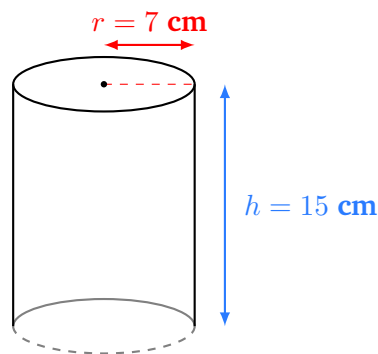
- (A) $x^2 - 2x + 15$
- (B) $x^2 - 2x - 15$
- (C) $x^2 + 2x - 15$
- (D) $x^2 - 8x - 15$



- Q19.** Find the area of the trapezium shown below, which has parallel sides of 7 cm (top) and 13 cm (bottom), and a perpendicular height of 10 cm.



- (A) 80 cm^2
(B) 90 cm^2
(C) 100 cm^2
(D) 120 cm^2
- Q20.** Find the total surface area of the cylinder shown below, with radius $r = 7 \text{ cm}$ and height $h = 15 \text{ cm}$. (Use $\pi = \frac{22}{7}$)



- (A) 968 cm^2
(B) 880 cm^2
(C) $1,056 \text{ cm}^2$
(D) 792 cm^2
- Q21.** Find the volume of a cuboid with dimensions $10 \text{ cm} \times 8 \text{ cm} \times 6 \text{ cm}$.

- (A) 420 cm^3
(B) 480 cm^3



(C) 540 cm^3

(D) 560 cm^3

Q22. Simplify: $(7^2 \times 7^{-3}) \times 7^2$

(A) 7^3

(B) 7^2

(C) 7

(D) 7^0

Q23. Express 0.00000324 in standard form.

(A) 3.24×10^{-6}

(B) 3.24×10^{-5}

(C) 32.4×10^{-7}

(D) 0.324×10^{-5}

Q24. 14 workers together earn Rs 5,600 in one week. How much do 9 workers earn in the same period (direct proportion)?

(A) Rs 3,200

(B) Rs 3,600

(C) Rs 4,000

(D) Rs 4,200

Q25. 12 pipes can fill a tank in 10 hours. If 4 pipes are closed, how many hours will 8 pipes take to fill the same tank? (inverse proportion)

(A) 8 hours

(B) 12 hours

(C) 15 hours

(D) 18 hours

Q26. Factorise: $9m^3n^2 - 12m^2n^3 + 15mn^4$



- (A) $3m^2n(3mn - 4n^2 + 5n^3)$
 (B) $mn^2(9m^2 - 12mn + 15n^2)$
 (C) $3m^2n^2(3 - 4n + 5n^2)$
 (D) $3mn^2(3m^2 - 4mn + 5n^2)$

Q27. Factorise: $9x^2 - 24xy + 16y^2$

- (A) $(3x + 4y)^2$
 (B) $(3x - 4y)(3x + 4y)$
 (C) $(3x - 4y)^2$
 (D) $(9x - 16y)^2$

Q28. Divide $x^2 + 5x + 6$ by $(x + 2)$. Find the quotient.

- (A) $x + 2$
 (B) $x + 3$
 (C) $x + 4$
 (D) $x + 6$

Q29. A card is drawn at random from cards numbered 1 to 20 (shown below, with prime numbers shaded). What is the probability that the drawn card shows a prime number?

1	2	3	4	5
6	7	8	9	10
11	12	13	14	15
16	17	18	19	20

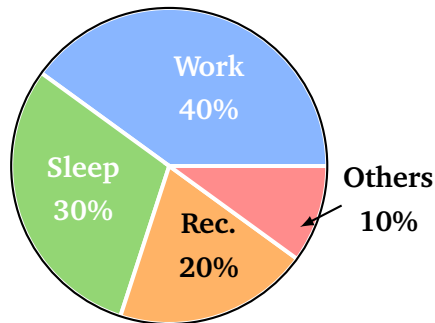
☒ Prime
☐ Non-prime

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



(D) $\frac{7}{20}$

Q30. A pie chart (shown below) represents how a person spends 24 hours in a day. How many hours does the person spend on Recreation?



- (A) 6 hours
- (B) 5 hours
- (C) 4.8 hours
- (D) 7.2 hours



Detailed Solutions

Q1.

Solution

Concept: The multiplicative inverse (reciprocal) of $\frac{a}{b}$ is $\frac{b}{a}$, so that their product equals 1.

Step 1: The given number is $\frac{-4}{7}$. Its multiplicative inverse is obtained by inverting the fraction:

$$\frac{-4}{7} \times \frac{-7}{4} = \frac{28}{28} = 1\checkmark$$

Why others are wrong: (A) $\frac{7}{4}$ loses the negative sign. (C) $\frac{4}{7}$ is the original fraction, not its inverse. (D) $\frac{-4}{7}$ is the number itself.

Final Answer: $\frac{7}{-4}$

Answer: (B)

Q2.

Solution

Concept: The Distributive Property of multiplication over addition states: $a \times (b + c) = a \times b + a \times c$.

Step 1: In the expression $\left(\frac{-2}{3}\right) \times \left(\frac{1}{2} + \frac{1}{4}\right) = \left(\frac{-2}{3}\right) \times \frac{1}{2} + \left(\frac{-2}{3}\right) \times \frac{1}{4}$, multiplication is distributed over addition.

Why others are wrong: (A) Commutative: $a \times b = b \times a$ (order change). (B) Associative: $(a \times b) \times c = a \times (b \times c)$ (grouping change). (D) Closure: product of rationals is rational.

Final Answer: Distributive Property

Answer: (C)

Q3.

Solution

Concept: Solve a linear equation by collecting variable terms on one side and constants on the other.

Step 1: $4p + 3 = 2p + 11 \Rightarrow 4p - 2p = 11 - 3 \Rightarrow 2p = 8$

Step 2: $p = \frac{8}{2} = 4$

Verification: LHS = $4(4) + 3 = 19$; RHS = $2(4) + 11 = 19 \checkmark$



Why others are wrong: (A) $p = 2$: LHS = 11, RHS = 15 $\neq$. (B) $p = 3$: LHS = 15, RHS = 17 $\neq$. (D) $p = 5$: LHS = 23, RHS = 21 $\neq$.

Final Answer: $p = 4$

Answer: (C)

Q4.

Solution

Concept: Set up a system of two linear equations from the given conditions.

Step 1: Let the larger number = x and the smaller = y .

$$x + y = 48, \quad x - y = 16$$

Step 2: Add the two equations:

$$2x = 64 \Rightarrow x = 32$$

Check: $y = 48 - 32 = 16$; difference = $32 - 16 = 16$ ✓

Why others are wrong: (A) 24 is the average (half of 48), not the larger number. (C) 36 and (D) 40 do not satisfy both conditions simultaneously.

Final Answer: 32

Answer: (B)

Q5.

Solution

Concept: Clear fractions by multiplying every term by the LCM of the denominators.

Step 1: LCM of 3, 4, 12 is 12. Multiply throughout:

$$4x - 3(x - 2) = 5$$

Step 2: Expand and simplify:

$$4x - 3x + 6 = 5 \Rightarrow x + 6 = 5 \Rightarrow x = -1$$

Verification: $\frac{-1}{3} - \frac{-1-2}{4} = \frac{-1}{3} + \frac{3}{4} = \frac{-4+9}{12} = \frac{5}{12}$ ✓

Why others are wrong: (A) $x = 1$: gives $\frac{1}{3} - \frac{-1}{4} = \frac{7}{12} \neq \frac{5}{12}$. (B) $x = 2$ and (D) $x = -2$ also fail verification.



Final Answer: $x = -1$

Answer: (C)

Q6.

Solution

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

Step 1: Sum of known angles = $80 + 120 = 200$.

Step 2: Sum of remaining two angles = $360 - 200 = 160$. Since they are equal:
each angle = $\frac{160}{2} = 80$.

Why others are wrong: (B) 70: two equal angles would sum to 140, giving total $340 \neq 360$. (C) 90: sum = 360 but only if both are 90 giving total 380. (D) 100: two of these give 200, total = 400.

Final Answer: 80

Answer: (A)

Q7.

Solution

Concept: In a parallelogram, adjacent (co-interior) angles are supplementary, i.e., they add up to 180.

Step 1: $\angle K$ and $\angle L$ are adjacent angles in parallelogram $KLMN$.

$$\angle K + \angle L = 180$$

Step 2: $\angle L = 180 - 60 = 120$

Why others are wrong: (A) 60: that would make $KLMN$ a rectangle (impossible since $\angle K = 60 \neq 90$). (C) 90: adjacent angles must sum to 180. (D) 150: $60 + 150 = 210 \neq 180$.

Final Answer: $\angle L = 120$

Answer: (B)

Q8.

Solution

Concept: A number is a perfect square if and only if every prime factor appears with an even exponent.

Step 1: Prime factorisation: $1800 = 2^3 \times 3^2 \times 5^2$.

Step 2: The exponent of 2 is 3 (odd). To make it even (4), we must multiply by



one more factor of 2.

$$1800 \times 2 = 3600 = 2^4 \times 3^2 \times 5^2 = (2^2 \times 3 \times 5)^2 = 60^2 \checkmark$$

Why others are wrong: (A) $\times 3$: gives $2^3 \times 3^3 \times 5^2$ (3 still odd). (B) $\times 5$: gives $2^3 \times 3^2 \times 5^3$ (2 and 5 odd). (C) $\times 6$: gives $2^4 \times 3^3 \times 5^2$ (3 still odd).

Final Answer: 2

Answer: (D)

Q9.

Solution

Concept: Long-division method for square roots groups digits in pairs from the right.

Step 1: Group: $\overline{51} \overline{84}$. Largest integer whose square ≤ 51 : 7 (since $7^2 = 49$). Write 7 as quotient; remainder = $51 - 49 = 2$.

Step 2: Bring down 84 $\rightarrow$ dividend = 284. Double quotient: 14. Find digit d such that $(140 + d) \times d \leq 284$: $d = 2$, since $142 \times 2 = 284$. Remainder = 0.

Quotient = 72. Check: $72^2 = 72 \times 72 = 5,184 \checkmark$

Why others are wrong: (B) $68^2 = 4,624$. (C) $76^2 = 5,776$. (D) $78^2 = 6,084$.

Final Answer: 72

Answer: (A)

Q10.

Solution

Concept: The formula $(2m, m^2 - 1, m^2 + 1)$ generates Pythagorean triplets for any integer $m > 1$.

Step 1: With $m = 6$:

$$2m = 12, \quad m^2 - 1 = 36 - 1 = 35, \quad m^2 + 1 = 36 + 1 = 37$$

Step 2 (Verification): $12^2 + 35^2 = 144 + 1,225 = 1,369 = 37^2 \checkmark$

Why others are wrong: (A) (10, 24, 26): uses $m = 5$. (C) (8, 15, 17): uses $m = 4$. (D) (5, 12, 13): uses $m = \frac{13}{2}$, a non-integer.

Final Answer: (12, 35, 37)

Answer: (B)

Q11.



Solution

Concept: To find the cube root, express the number as a perfect cube by prime factorisation.

Step 1: $5832 = 8 \times 729 = 2^3 \times 3^6$.

Step 2: $\sqrt[3]{5832} = \sqrt[3]{2^3 \times 3^6} = 2 \times 3^2 = 2 \times 9 = 18$.

Verification: $18^3 = 18 \times 18 \times 18 = 324 \times 18 = 5,832 \checkmark$

Why others are wrong: (A) $16^3 = 4,096$. (B) $14^3 = 2,744$. (C) $20^3 = 8,000$.

Final Answer: 18

Answer: (D)

Q12.

Solution

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

Step 1: $19,683 = 3^9$ (since $3^9 = 19,683$).

Step 2: $\sqrt[3]{3^9} = 3^{9/3} = 3^3 = 27$.

Verification: $27^3 = 27 \times 27 \times 27 = 729 \times 27 = 19,683 \checkmark$

Why others are wrong: (A) $23^3 = 12,167$. (B) $25^3 = 15,625$. (D) $29^3 = 24,389$.

Final Answer: 27

Answer: (C)

Q13.

Solution

Concept: $\text{Loss}\% = \frac{\text{Loss}}{\text{Cost Price}} \times 100$.

Step 1: $\text{Loss} = \text{CP} - \text{SP} = 12,000 - 10,200 = \text{Rs } 1,800$.

Step 2: $\text{Loss}\% = \frac{1,800}{12,000} \times 100 = \frac{180,000}{12,000} = 15\%$.

Why others are wrong: (A) 10%: $10\% \times 12,000 = 1,200 \neq 1,800$. (C) 12%: gives Rs 1,440. (D) 20%: gives Rs 2,400.

Final Answer: 15%

Answer: (B)

Q14.

Solution

Concept: Compound Interest = $P \left[\left(1 + \frac{r}{100} \right)^t - 1 \right]$, compounded annually.



Step 1: Amount after 2 years:

$$A = 6000 \times \left(1 + \frac{10}{100}\right)^2 = 6000 \times (1.1)^2 = 6000 \times 1.21 = \text{Rs } 7,260$$

Step 2: $CI = A - P = 7,260 - 6,000 = \text{Rs } 1,260$.

Why others are wrong: (A) Rs 1,200 is simple interest ($6000 \times 10\% \times 2 = 1200$), not CI. (B) Rs 1,100 and (D) Rs 1,320 are arithmetically incorrect.

Final Answer: Rs 1,260

Answer: (C)

Q15.

Solution

Concept: Sale Price = Marked Price $\times \left(1 - \frac{\text{Discount}\%}{100}\right)$.

Step 1: Discount = $25\% \times 2,800 = \text{Rs } 700$.

Step 2: Sale Price = $2,800 - 700 = \text{Rs } 2,100$.

Why others are wrong: (B) Rs 2,000 implies a discount of Rs 800 ($\approx 28.6\%$). (C) Rs 2,200 implies only Rs 600 discount ($\approx 21.4\%$). (D) Rs 1,800 implies Rs 1,000 discount ($\approx 35.7\%$).

Final Answer: Rs 2,100

Answer: (A)

Q16.

Solution

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

Step 1: Here $a = 3m$ and $b = 2n$.

$$(3m - 2n)(3m + 2n) = (3m)^2 - (2n)^2$$

Step 2: $= 9m^2 - 4n^2$.

Why others are wrong: (A) $9m^2 + 4n^2$: uses addition, applies to $(a+bi)(a-bi)$ over complex numbers. (B) $6m^2 - 4n^2$: multiplied $3m \times 2m$ incorrectly. (D) $3m^2 - 2n^2$: forgot to square the coefficients.

Final Answer: $9m^2 - 4n^2$

Answer: (C)



Q17.

Solution**Concept:** $(a - b)^2 = a^2 - 2ab + b^2$.**Step 1:** Write $98 = 100 - 2$. So $a = 100$, $b = 2$.

$$(98)^2 = (100)^2 - 2 \times 100 \times 2 + (2)^2$$

Step 2: $= 10,000 - 400 + 4 = 9,604$.**Why others are wrong:** (A) 9,506: forgot the b^2 term. (B) 9,800: only subtracted $2ab$. (C) 9,801 is 99^2 , not 98^2 .**Final Answer:** 9,604Answer: (D)

Q18.

Solution**Concept:** Expand using the distributive law (FOIL): $(x + a)(x + b) = x^2 + (a + b)x + ab$.**Step 1:** $(x + 3)(x - 5)$ has $a = 3$, $b = -5$.

$$= x^2 + (3 + (-5))x + (3)(-5)$$

Step 2: $= x^2 + (-2)x + (-15) = x^2 - 2x - 15$.**Why others are wrong:** (A) $x^2 - 2x + 15$: wrong sign on constant. (C) $x^2 + 2x - 15$: wrong sign on x term. (D) $x^2 - 8x - 15$: adds a and b incorrectly (uses $3 - 5$ for -2 but gets -8).**Final Answer:** $x^2 - 2x - 15$ Answer: (B)

Q19.

Solution**Concept:** Area of trapezium $= \frac{1}{2} \times (\text{sum of parallel sides}) \times \text{height}$.**Step 1:** Parallel sides = 7 cm and 13 cm; height = 10 cm.

$$\text{Area} = \frac{1}{2} \times (7 + 13) \times 10$$

Step 2: $= \frac{1}{2} \times 20 \times 10 = 10 \times 10 = 100 \text{ cm}^2$.

Why others are wrong: (A) 80 cm^2 : uses height 8 cm. (B) 90 cm^2 : uses average only without height. (D) 120 cm^2 : uses sum directly without halving.

Final Answer: 100 cm^2

Answer: (C)

Q20.

Solution

Concept: Total Surface Area of cylinder $= 2\pi r(r + h)$.

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

$$\text{TSA} = 2 \times \frac{22}{7} \times 7 \times (7 + 15)$$

Step 2:

$$= 2 \times \frac{22}{7} \times 7 \times 22 = 2 \times 22 \times 22 = 44 \times 22 = 968 \text{ cm}^2$$

Why others are wrong: (B) 880 cm^2 : uses only lateral surface area $2\pi rh$. (C) $1,056 \text{ cm}^2$: uses $r + h = 25$ but makes an arithmetic error. (D) 792 cm^2 : incorrect formula or arithmetic.

Final Answer: 968 cm^2

Answer: (A)

Q21.

Solution

Concept: Volume of cuboid $= \text{length} \times \text{breadth} \times \text{height}$.

Step 1: $V = 10 \times 8 \times 6$.

Step 2: $V = 80 \times 6 = 480 \text{ cm}^3$.

Why others are wrong: (A) 420 cm^3 : $10 \times 6 \times 7$ (wrong dimension). (C) 540 cm^3 : $10 \times 9 \times 6$. (D) 560 cm^3 : incorrect product.

Final Answer: 480 cm^3

Answer: (B)

Q22.

Solution

Concept: Laws of exponents: $a^m \times a^n = a^{m+n}$. Add exponents when bases are the same.

Step 1: $(7^2 \times 7^{-3}) \times 7^2 = 7^{2+(-3)} \times 7^2 = 7^{-1} \times 7^2$.



Step 2: $= 7^{-1+2} = 7^1 = 7$.

Why others are wrong: (A) 7^3 : adds $2 + (-3) + 2 = 1$, not 3. (B) 7^2 : ignores the negative exponent. (D) $7^0 = 1$: total exponent is 1, not 0.

Final Answer: 7

Answer: (C)

Q23.

Solution

Concept: Standard form: $a \times 10^n$ where $1 \leq a < 10$ and n is an integer.

Step 1: Count decimal places moved right to reach 3.24: move 6 places.

$$0.00000324 = 3.24 \times 10^{-6}$$

Step 2: Check: $1 \leq 3.24 < 10$ ✓; exponent -6 accounts for 6 leftward shifts.

Why others are wrong: (B) 10^{-5} : only 5 places (gives 0.0000324). (C) 32.4×10^{-7} : coefficient $32.4 > 10$, not standard form. (D) 0.324×10^{-5} : coefficient < 1 , not standard form.

Final Answer: 3.24×10^{-6}

Answer: (A)

Q24.

Solution

Concept: Direct proportion — more workers earn more. $\frac{W_1}{E_1} = \frac{W_2}{E_2}$.

Step 1: Earnings per worker per week $= \frac{5,600}{14} = \text{Rs } 400$.

Step 2: Earnings for 9 workers $= 9 \times 400 = \text{Rs } 3,600$.

Verification: $\frac{14}{5,600} = \frac{9}{3,600}$, both equal $\frac{1}{400}$ ✓

Why others are wrong: (A) Rs 3,200: $3200/9 \neq 400$. (C) Rs 4,000: $4000/9 \neq 400$. (D) Rs 4,200: $4200/9 \neq 400$.

Final Answer: Rs 3,600

Answer: (B)

Q25.



Solution

Concept: Inverse proportion — more pipes, less time. $p_1 t_1 = p_2 t_2$.

Step 1: $12 \times 10 = 8 \times t_2$.

Step 2: $t_2 = \frac{12 \times 10}{8} = \frac{120}{8} = 15$ hours.

Verification: $12 \times 10 = 120 = 8 \times 15$ ✓

Why others are wrong: (A) 8 hours: $8 \times 8 = 64 \neq 120$. (B) 12 hours: that would mean the pipe count has no effect. (D) 18 hours: $8 \times 18 = 144 \neq 120$.

Final Answer: 15 hours

Answer: (C)

Solution

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

Step 1: Identify HCF.

Q26. • Coefficients: $\text{HCF}(9, 12, 15) = 3$

• Powers of m : lowest is m^1

• Powers of n : lowest is n^2

$\therefore \text{HCF} = 3mn^2$

Step 2: Divide each term:

$$\frac{9m^3n^2}{3mn^2} = 3m^2, \quad \frac{12m^2n^3}{3mn^2} = 4mn, \quad \frac{15mn^4}{3mn^2} = 5n^2$$

$$9m^3n^2 - 12m^2n^3 + 15mn^4 = 3mn^2(3m^2 - 4mn + 5n^2)$$

Why others are wrong: (A) $3m^2n$: misidentifies HCF. (B) mn^2 : factor of 3 is missing. (C) $3m^2n^2$: extra m in HCF.

Final Answer: $3mn^2(3m^2 - 4mn + 5n^2)$

Answer: (D)

Q27.

Solution

Concept: Perfect square trinomial identity: $a^2 - 2ab + b^2 = (a - b)^2$.

Step 1: Identify a and b :

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

Check: $2 \times 3x \times 4y = 24xy$ ✓



Step 2: $= (3x - 4y)^2$.

Why others are wrong: (A) $(3x + 4y)^2 = 9x^2 + 24xy + 16y^2$: middle term sign wrong. (B) $(3x - 4y)(3x + 4y) = 9x^2 - 16y^2$: difference of squares, no middle term. (D) $(9x - 16y)^2 = 81x^2 - 288xy + 256y^2$: coefficients wrong.

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

Answer: (C)

Q28.

Solution

Concept: Divide a polynomial by factorising the numerator and cancelling the common factor.

Step 1: Factorise the dividend: $x^2 + 5x + 6 = (x + 2)(x + 3)$.

(Check: $2 \times 3 = 6$ and $2 + 3 = 5$ ✓)

Step 2: Divide by $(x + 2)$:

$$\frac{(x + 2)(x + 3)}{(x + 2)} = x + 3$$

Why others are wrong: (A) $x + 2$: that would mean $x^2 + 4x + 4 \div (x + 2)$, a different polynomial. (C) $x + 4$: $(x + 2)(x + 4) = x^2 + 6x + 8 \neq x^2 + 5x + 6$. (D) $x + 6$: product would be $x^2 + 8x + 12$.

Final Answer: $x + 3$

Answer: (B)

Q29.

Solution

Concept: Probability = $\frac{\text{Number of favourable outcomes}}{\text{Total outcomes}}$. A prime number has exactly two distinct factors: 1 and itself. Note: 1 is *not* prime.

Step 1: List primes from 1 to 20:

2, 3, 5, 7, 11, 13, 17, 19 — that is 8 prime numbers.

Step 2: Total cards = 20.

$$P(\text{prime}) = \frac{8}{20} = \frac{2}{5}$$

Why others are wrong: (B) $\frac{1}{4} = \frac{5}{20}$: only 5 primes counted (likely missed 11, 13, 17, or 19). (C) $\frac{3}{5} = \frac{12}{20}$: non-primes counted instead. (D) $\frac{7}{20}$: one prime overlooked.



Final Answer: $\frac{2}{5}$

Answer: (A)

Q30.

Solution

Concept: From a pie chart, hours for a sector = (percentage/100) $\times$ total hours.

Step 1: Recreation sector = 20% of the pie.

Step 2:

$$\text{Hours} = \frac{20}{100} \times 24 = \frac{480}{100} = 4.8 \text{ hours}$$

Alternative check (using angle): Recreation angle = 20% $\times$ 360 = 72.

$$\text{Hours} = \frac{72}{360} \times 24 = \frac{1}{5} \times 24 = 4.8 \text{ hours } \checkmark$$

Why others are wrong: (A) 6 hours = 25% of 24 h (not 20%). (B) 5 hours $\approx$ 20.8% (not exact). (D) 7.2 hours = 30% of 24 h (that is the Sleep sector).

Final Answer: 4.8 hours

Answer: (C)



Answer Key

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

