

Jharkhand Polytechnic Mathematics

Sample Paper – 4

Duration: 50 Minutes

Maximum Marks: 50

Instructions

- This paper contains **50** Multiple Choice Questions (Single Correct Answer), modelled on the Mathematics section of the **Jharkhand Polytechnic (PECE)** entrance examination conducted by JCECEB.
- Each correct answer carries **+1 mark**. There is a **negative marking of 0.25 mark** for every wrong answer. Unattempted questions carry **no penalty**.
- Only **one** option is correct. Choose carefully.
- This is an offline OMR based test. Darken the correct bubble fully with a blue or black ball pen.
- Use of mobile phones, calculators, or electronic gadgets is strictly prohibited.

Q1. The HCF (highest common factor) of 14 and 21 is:

- (A) 42
- (B) 14
- (C) 7
- (D) 3

Q2. The LCM (lowest common multiple) of 10 and 15 is:

- (A) 30
- (B) 5
- (C) 150
- (D) 15



Q3. The number that is neither prime nor composite is:

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

Q4. Among the numbers given below, the rational one is:

- (A) $\sqrt{2}$
- (B) 0.75
- (C) $\sqrt{5}$
- (D) π

Q5. The place value of the digit 9 in the number 2934 is:

- (A) 9
- (B) 90
- (C) 900
- (D) 9000

Q6. If $3x - 2 = 10$, then the value of x is:

- (A) 4
- (B) 12
- (C) 3
- (D) 8

Q7. The value of $(a + b)^2$ when $a = 1$ and $b = 5$ is:

- (A) 26
- (B) 10
- (C) 11



(D) 36

Q8. The factors of $x^2 - 1$ are:

(A) $(x - 1)(x - 1)$

(B) $(x - 1)(x + 1)$

(C) $(x + 1)(x + 1)$

(D) $(x - 1)(x + 2)$

Q9. If $\frac{x}{3} = 6$, then x equals:

(A) 18

(B) 2

(C) 9

(D) 3

Q10. The roots of the quadratic equation $x^2 - 8x + 15 = 0$ are:

(A) 1, 15

(B) -3, -5

(C) 3, 5

(D) 2, 4

Q11. On simplifying, $8b + 2b$ equals:

(A) $16b$

(B) $10b$

(C) $10b^2$

(D) $6b$

Q12. If $a = 3$, the value of $2a^2 + 3$ is:

(A) 39



- (B) 9
- (C) 15
- (D) 21

Q13. The ratio 30 : 45 in its simplest form is:

- (A) 2 : 3
- (B) 3 : 2
- (C) 6 : 9
- (D) 1 : 2

Q14. The average of 6, 9, 12, 15 and 18 is:

- (A) 15
- (B) 60
- (C) 12
- (D) 10

Q15. The mean proportional between 9 and 16 is:

- (A) 144
- (B) 12
- (C) 25
- (D) 24

Q16. If $a : b = 4 : 5$ and $a + b = 36$, then the value of a is:

- (A) 20
- (B) 4
- (C) 9
- (D) 16

Q17. 30% of 300 is:



- (A) 90
- (B) 30
- (C) 900
- (D) 60

Q18. An article bought for Rs. 250 is sold for Rs. 300. The profit per cent is:

- (A) 50%
- (B) 20%
- (C) 25%
- (D) 15%

Q19. The fraction $\frac{7}{10}$ expressed as a percentage is:

- (A) 7%
- (B) 0.7%
- (C) 70%
- (D) 700%

Q20. A bag marked at Rs. 600 is sold at a discount of 20%. Its selling price is:

- (A) Rs. 620
- (B) Rs. 120
- (C) Rs. 500
- (D) Rs. 480

Q21. A number increased by 25% becomes 100. The original number is:

- (A) 80
- (B) 75
- (C) 125
- (D) 120



- Q22.** The simple interest on Rs. 2500 at 6% per annum for 2 years is:
- (A) Rs. 150
 - (B) Rs. 300
 - (C) Rs. 600
 - (D) Rs. 250
- Q23.** The compound interest on Rs. 4000 at 10% per annum for 2 years (compounded annually) is:
- (A) Rs. 800
 - (B) Rs. 400
 - (C) Rs. 840
 - (D) Rs. 4840
- Q24.** At what rate per annum will Rs. 1000 earn a simple interest of Rs. 300 in 3 years?
- (A) 10%
 - (B) 3%
 - (C) 30%
 - (D) 5%
- Q25.** If A can complete a piece of work in 12 days, the part of the work A does in one day is:
- (A) 12
 - (B) $\frac{1}{6}$
 - (C) $\frac{1}{24}$
 - (D) $\frac{1}{12}$
- Q26.** A can do a work in 15 days and B can do the same work in 30 days. Working together, they finish it in:



- (A) 45 days
- (B) 10 days
- (C) 20 days
- (D) 5 days

Q27. A pipe can fill a tank in 10 hours. The part of the tank it fills in one hour is:

- (A) 10
- (B) $\frac{1}{5}$
- (C) $\frac{1}{10}$
- (D) $\frac{1}{20}$

Q28. A car travels 270 km in 3 hours. Its average speed is:

- (A) 90 km/h
- (B) 80 km/h
- (C) 270 km/h
- (D) 810 km/h

Q29. A train 180 m long crosses a pole in 6 seconds. Its speed is:

- (A) 180 m/s
- (B) 1080 m/s
- (C) 6 m/s
- (D) 30 m/s

Q30. The distance covered by a vehicle moving at 80 km/h in 2.5 hours is:

- (A) 160 km
- (B) 200 km
- (C) 82.5 km



(D) 320 km

Q31. The speed of a boat in still water is 18 km/h and the speed of the stream is 6 km/h. The upstream speed of the boat is:

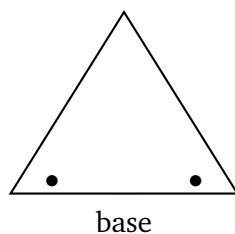
(A) 12 km/h

(B) 24 km/h

(C) 6 km/h

(D) 3 km/h

Q32. In the isosceles triangle shown, two of its sides are equal. The number of its angles that are equal is:



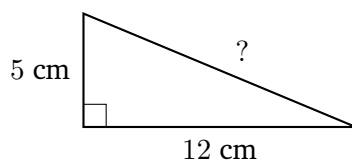
(A) none

(B) three

(C) two

(D) one

Q33. In the right-angled triangle shown, the legs measure 5 cm and 12 cm. The length of the hypotenuse is:



(A) 7 cm

(B) 17 cm

(C) 60 cm



(D) 13 cm

Q34. Two angles forming a linear pair add up to:

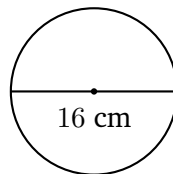
(A) 90°

(B) 180°

(C) 360°

(D) 270°

Q35. The radius of the circle shown, whose diameter is 16 cm, is:



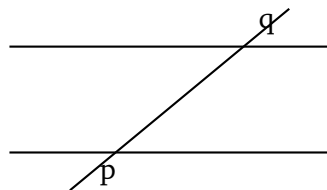
(A) 8 cm

(B) 32 cm

(C) 16 cm

(D) 4 cm

Q36. In the figure, two parallel lines are cut by a transversal. The pair of alternate exterior angles so formed are always:



(A) supplementary

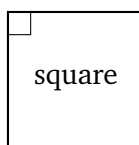
(B) complementary

(C) equal

(D) zero

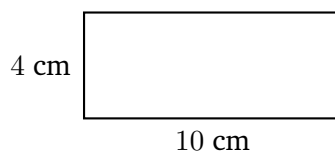
Q37. Each interior angle of the square shown measures:





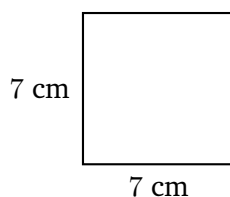
- (A) 60°
- (B) 120°
- (C) 45°
- (D) 90°

Q38. The perimeter of the rectangle shown, of length 10 cm and breadth 4 cm, is:



- (A) 40 cm
- (B) 28 cm
- (C) 14 cm
- (D) 24 cm

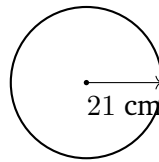
Q39. The area of the square shown, of side 7 cm, is:



- (A) 49 cm^2
- (B) 28 cm^2
- (C) 14 cm^2
- (D) 21 cm^2

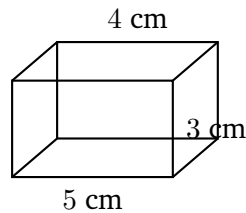
Q40. The circumference of a circle of radius 21 cm $\left(\text{take } \pi = \frac{22}{7}\right)$ is:





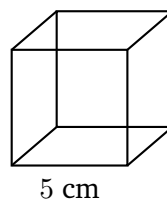
- (A) 66 cm
- (B) 44 cm
- (C) 132 cm
- (D) 1386 cm

Q41. The volume of the cuboid shown, of length 5 cm, breadth 4 cm and height 3 cm, is:



- (A) 12 cm^3
- (B) 47 cm^3
- (C) 120 cm^3
- (D) 60 cm^3

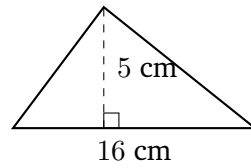
Q42. The volume of the cube shown, of side 5 cm, is:



- (A) 25 cm^3
- (B) 125 cm^3
- (C) 15 cm^3
- (D) 75 cm^3



Q43. The area of the triangle shown, with base 16 cm and height 5 cm, is:



- (A) 40 cm^2
- (B) 80 cm^2
- (C) 21 cm^2
- (D) 20 cm^2

Q44. The value of $\sin 60^\circ$ is:

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

Q45. The value of $\tan 0^\circ$ is:

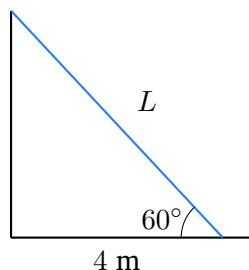
- (A) 1
- (B) $\sqrt{3}$
- (C) $\frac{1}{\sqrt{3}}$
- (D) 0

Q46. The value of $\cos 45^\circ$ is:

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



- Q47.** A ladder leans against a wall making an angle of 60° with the ground, and its foot is 4 m from the wall, as shown. The length of the ladder is:



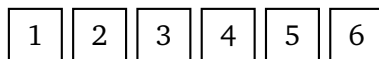
- (A) 8 m
(B) 4 m
(C) 2 m
(D) $8\sqrt{3}$ m
- Q48.** The mean (average) of the numbers 3, 6, 9, 12, 15 is:

- (A) 45
(B) 12
(C) 9
(D) 6

- Q49.** The mode of the data 5, 5, 6, 7, 8 is:

- (A) 6
(B) 5
(C) 7
(D) 8

- Q50.** A fair die with faces 1 to 6, shown below, is rolled once. The probability of getting a number greater than 4 is:



- (A) $\frac{1}{2}$



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



Detailed Solutions**Q1.****Solution**

Concept — HCF: The HCF of two numbers is the largest number that divides both of them exactly.

Step 1 — Write the prime factors: $14 = 2 \times 7$ and $21 = 3 \times 7$.

Step 2 — Pick the common factor: The only common prime factor is 7, so the HCF is 7.

Why other options are wrong:

- 42 is the LCM, not the HCF.
- 14 and 3 do not divide both numbers.

Final Answer: $\text{HCF} = 7 \Rightarrow \boxed{\text{C}}$

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

Q2.**Solution**

Concept — LCM: The LCM of two numbers is the smallest number that is a multiple of both.

Step 1 — List multiples: Multiples of 10: 10, 20, 30, ...; multiples of 15: 15, 30, 45, ...

Step 2 — Find the smallest common one: The smallest common multiple is 30.

Why other options are wrong:

- 5 is the HCF of 10 and 15.
- 150 is the product, and 15 is not a multiple of 10.

Final Answer: $\text{LCM} = 30 \Rightarrow \boxed{\text{A}}$

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



Q3.

Solution

Concept — Prime and composite numbers: A prime number has exactly two factors; a composite number has more than two factors.

Step 1 — Examine 1: The number 1 has only one factor, itself.

Step 2 — Classify: Since 1 has neither exactly two factors nor more than two, it is neither prime nor composite.

Why other options are wrong:

- 2 and 3 are prime numbers.
- 0 is not considered in the prime/composite classification of natural numbers.

Final Answer: The required number is 1 $\Rightarrow$ **D**

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

Q4.

Solution

Concept — Rational and irrational numbers: A rational number can be written as a fraction of integers; its decimal form ends or repeats.

Step 1 — Test each option: $\sqrt{2} = 1.414\dots$, $\sqrt{5} = 2.236\dots$ and $\pi = 3.1415\dots$ never end or repeat.

Step 2 — Identify the rational one: $0.75 = \frac{75}{100} = \frac{3}{4}$, a fraction of integers, so it is rational.

Why other options are wrong:

- $\sqrt{2}$, $\sqrt{5}$ and π are all irrational.

Final Answer: 0.75 is rational $\Rightarrow$ **B**

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



Q5.

Solution

Concept — Place value: The place value of a digit is the digit multiplied by the value of its place.

Step 1 — Locate the digit: In 2934, the digit 9 is in the hundreds place.

Step 2 — Multiply: Place value = $9 \times 100 = 900$.

Why other options are wrong:

- 9 is the face value, not the place value.
- 90 and 9000 use the wrong place.

Final Answer: Place value = 900 $\Rightarrow$

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

Q6.

Solution

Concept — Linear equation: Move the constant to the other side, then divide by the coefficient of x .

Step 1 — Add 2 to both sides: $3x = 10 + 2 = 12$.

Step 2 — Divide by 3: $x = \frac{12}{3} = 4$.

Why other options are wrong:

- 12 is $3x$, not x .
- 3 and 8 come from wrong steps.

Final Answer: $x = 4 \Rightarrow$

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



Q7.

Solution

Concept — Algebraic identity: $(a + b)^2 = a^2 + 2ab + b^2$, or simply square the sum.

Step 1 — Add first: $a + b = 1 + 5 = 6$.

Step 2 — Square the sum: $(6)^2 = 36$.

Why other options are wrong:

- $26 = a^2 + b^2$ forgets the $2ab$ term.
- $10 = 2ab$ only.
- 11 comes from adding wrongly.

Final Answer: $(a + b)^2 = 36 \Rightarrow \boxed{D}$

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

Q8.

Solution

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

Step 1 — Write 1 as a square: $x^2 - 1 = x^2 - 1^2$.

Step 2 — Apply the identity: $x^2 - 1^2 = (x - 1)(x + 1)$.

Why other options are wrong:

- $(x - 1)(x - 1) = x^2 - 2x + 1$, which is wrong.
- $(x + 1)(x + 1)$ and $(x - 1)(x + 2)$ do not multiply back to $x^2 - 1$.

Final Answer: $x^2 - 1 = (x - 1)(x + 1) \Rightarrow \boxed{B}$

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



Q9.

Solution

Concept — Simple equation: To remove a division by 3, multiply both sides by 3.

Step 1 — Multiply by 3: $x = 6 \times 3$.

Step 2 — Compute: $x = 18$.

Why other options are wrong:

- 2 divides instead of multiplying.
- 9 and 3 come from wrong operations.

Final Answer: $x = 18 \Rightarrow$ A

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

Q10.

Solution

Concept — Quadratic roots: Factorise so that the two factors multiply to +15 and add to -8.

Step 1 — Split the middle term: $x^2 - 8x + 15 = (x - 3)(x - 5)$.

Step 2 — Set each factor to zero: $x - 3 = 0$ or $x - 5 = 0$, giving $x = 3$ or $x = 5$.

Why other options are wrong:

- 1, 15 and 2, 4 do not satisfy the equation.
- -3, -5 would need the equation $x^2 + 8x + 15$.

Final Answer: Roots are 3 and 5 $\Rightarrow$ C

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



Q11.

Solution

Concept — Like terms: Terms with the same variable are added by adding their coefficients.

Step 1 — Add the coefficients: $8 + 2 = 10$.

Step 2 — Attach the variable: $8b + 2b = 10b$.

Why other options are wrong:

- $16b$ multiplies the coefficients.
- $10b^2$ wrongly multiplies the variables too.
- $6b$ subtracts them.

Final Answer: $8b + 2b = 10b \Rightarrow$ B

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

Q12.

Solution

Concept — Substitution: Replace the variable with its value and follow the order of operations.

Step 1 — Square first: $a^2 = 3^2 = 9$.

Step 2 — Multiply by 2: $2 \times 9 = 18$.

Step 3 — Add 3: $18 + 3 = 21$.

Why other options are wrong:

- 39 uses $(2a)^2 + 3$.
- 9 uses $2a + 3$.
- 15 comes from a wrong step.

Final Answer: $2a^2 + 3 = 21 \Rightarrow$ D

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



Q13.

Solution**Concept — Simplifying ratios:** Divide both terms of the ratio by their HCF.**Step 1 — Find the HCF:** HCF of 30 and 45 is 15.**Step 2 — Divide both terms:** $\frac{30}{15} : \frac{45}{15} = 2 : 3$.**Why other options are wrong:**

- 3 : 2 reverses the ratio.
- 6 : 9 is not fully simplified.
- 1 : 2 is incorrect.

Final Answer: $30 : 45 = 2 : 3 \Rightarrow \boxed{A}$ **Answer: (A)** [Go Back to Q13](#)

Q14.

Solution**Concept — Average:** $\text{Average} = \frac{\text{sum of values}}{\text{number of values}}$.**Step 1 — Add the values:** $6 + 9 + 12 + 15 + 18 = 60$.**Step 2 — Divide by the count:** $\frac{60}{5} = 12$.**Why other options are wrong:**

- 60 is the sum, not the average.
- 15 is one of the values.
- 10 uses a wrong divisor.

Final Answer: $\text{Average} = 12 \Rightarrow \boxed{C}$ **Answer: (C)** [Go Back to Q14](#)

Q15.

Solution

Concept — Mean proportional: The mean proportional between two numbers a and b is $\sqrt{a \times b}$.

Step 1 — Multiply the numbers: $9 \times 16 = 144$.

Step 2 — Take the square root: $\sqrt{144} = 12$.

Why other options are wrong:

- 144 is the product, not its square root.
- 25 is the sum, and 24 is incorrect.

Final Answer: Mean proportional = 12 $\Rightarrow$ **B**

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

Q16.

Solution

Concept — Dividing in a ratio: The total is split in the ratio 4 : 5, so the parts are 4 and 5 out of $4 + 5 = 9$.

Step 1 — Find one part: $\frac{36}{9} = 4$.

Step 2 — Find a : $a = 4 \times 4 = 16$.

Why other options are wrong:

- 20 is the value of b .
- 4 is one part only, and 9 is the total number of parts.

Final Answer: $a = 16 \Rightarrow$ **D**

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



Q17.

Solution

Concept — Percentage: $x\%$ of a number $= \frac{x}{100} \times \text{number}$.

Step 1 — Write the fraction: $30\% = \frac{30}{100}$.

Step 2 — Multiply: $\frac{30}{100} \times 300 = 90$.

Why other options are wrong:

- 30 is the percentage value, not the result.
- 900 and 60 use wrong steps.

Final Answer: 30% of $300 = 90 \Rightarrow$ A

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

Q18.

Solution

Concept — Profit per cent: $\text{Profit}\% = \frac{\text{Profit}}{\text{Cost price}} \times 100$.

Step 1 — Find the profit: $\text{Profit} = 300 - 250 = 50$.

Step 2 — Apply the formula: $\text{Profit}\% = \frac{50}{250} \times 100 = 20\%$.

Why other options are wrong:

- 50% wrongly uses 50 as the percentage.
- 25% and 15% use wrong numbers.

Final Answer: $\text{Profit} = 20\% \Rightarrow$ B

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



Q19.

Solution

Concept — Fraction to percentage: Multiply the fraction by 100 and add the % sign.

Step 1 — Multiply by 100: $\frac{7}{10} \times 100 = 70$.

Step 2 — Add the sign: $\frac{7}{10} = 70\%$.

Why other options are wrong:

- 7% and 0.7% move the decimal wrongly.
- 700% multiplies by 1000.

Final Answer: $\frac{7}{10} = 70\% \Rightarrow \boxed{\text{C}}$

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

Q20.

Solution

Concept — Discount: Selling price = marked price – discount, where discount = discount% of marked price.

Step 1 — Find the discount: 20% of 600 = $\frac{20}{100} \times 600 = 120$.

Step 2 — Subtract: Selling price = 600 – 120 = 480.

Why other options are wrong:

- Rs. 620 adds instead of subtracting.
- Rs. 120 is the discount itself.
- Rs. 500 uses a wrong discount.

Final Answer: Selling price = Rs. 480 $\Rightarrow \boxed{\text{D}}$

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



Q21.

Solution

Concept — Reverse percentage: If a number increased by 25% becomes 100, then 125% of the number is 100.

Step 1 — Write the equation: $\frac{125}{100} \times x = 100$.

Step 2 — Solve for x : $x = \frac{100 \times 100}{125} = 80$.

Why other options are wrong:

- 75, 125 and 120 do not give 100 after a 25% rise.

Final Answer: The original number is 80 $\Rightarrow$ **A**

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

Q22.

Solution

Concept — Simple interest: $SI = \frac{P \times R \times T}{100}$.

Step 1 — List the data: $P = 2500, R = 6, T = 2$.

Step 2 — Substitute: $SI = \frac{2500 \times 6 \times 2}{100}$.

Step 3 — Compute: $SI = \frac{30000}{100} = 300$.

Why other options are wrong:

- Rs. 150 uses $T = 1$.
- Rs. 600 omits a division, and Rs. 250 is unrelated.

Final Answer: $SI = \text{Rs. } 300 \Rightarrow$ **B**

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



Q23.

Solution

Concept — Compound interest: $\text{Amount} = P \left(1 + \frac{R}{100}\right)^T$, and $\text{CI} = \text{Amount} - P$.

Step 1 — Find the amount: $A = 4000 \left(1 + \frac{10}{100}\right)^2 = 4000 \times (1.1)^2$.

Step 2 — Compute the power: $(1.1)^2 = 1.21$, so $A = 4000 \times 1.21 = 4840$.

Step 3 — Subtract the principal: $\text{CI} = 4840 - 4000 = 840$.

Why other options are wrong:

- Rs. 800 is the simple interest.
- Rs. 4840 is the total amount, not the interest.

Final Answer: $\text{CI} = \text{Rs. } 840 \Rightarrow \boxed{\text{C}}$

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

Q24.

Solution

Concept — Finding the rate: From $\text{SI} = \frac{PRT}{100}$, we get $R = \frac{\text{SI} \times 100}{P \times T}$.

Step 1 — List the data: $\text{SI} = 300$, $P = 1000$, $T = 3$.

Step 2 — Substitute: $R = \frac{300 \times 100}{1000 \times 3}$.

Step 3 — Compute: $R = \frac{30000}{3000} = 10\%$.

Why other options are wrong:

- 3%, 30% and 5% do not give Rs. 300 interest.

Final Answer: $\text{Rate} = 10\% \Rightarrow \boxed{\text{A}}$

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



Q25.

Solution

Concept — One day's work: If a person finishes a job in n days, the part done in one day is $\frac{1}{n}$.

Step 1 — Apply with $n = 12$: One day's work = $\frac{1}{12}$.

Step 2 — Confirm: In 12 days, $12 \times \frac{1}{12} = 1$ whole work.

Why other options are wrong:

- 12 is the number of days, not the part.
- $\frac{1}{6}$ and $\frac{1}{24}$ are wrong fractions.

Final Answer: One day's work = $\frac{1}{12} \Rightarrow \boxed{\text{D}}$

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

Q26.

Solution

Concept — Combined work: Add the one-day works and take the reciprocal for the total time.

Step 1 — One day's work each: A does $\frac{1}{15}$, B does $\frac{1}{30}$.

Step 2 — Add them: $\frac{1}{15} + \frac{1}{30} = \frac{2}{30} + \frac{1}{30} = \frac{3}{30} = \frac{1}{10}$.

Step 3 — Take the reciprocal: Time together = 10 days.

Why other options are wrong:

- 45 and 20 days come from wrong addition.
- 5 days is too fast.

Final Answer: They finish in 10 days $\Rightarrow \boxed{\text{B}}$

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



Q27.

Solution

Concept — Filling rate: A pipe that fills a tank in n hours fills $\frac{1}{n}$ of it in one hour.

Step 1 — Apply with $n = 10$: One hour's filling = $\frac{1}{10}$.

Step 2 — Confirm: In 10 hours, $10 \times \frac{1}{10} = 1$ full tank.

Why other options are wrong:

- 10 is the number of hours, not the part.
- $\frac{1}{5}$ and $\frac{1}{20}$ are wrong fractions.

Final Answer: One hour's work = $\frac{1}{10} \Rightarrow \boxed{\text{C}}$

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

Q28.

Solution

Concept — Speed: $\text{Speed} = \frac{\text{distance}}{\text{time}}$.

Step 1 — List the data: Distance = 270 km, time = 3 h.

Step 2 — Divide: $\text{Speed} = \frac{270}{3} = 90 \text{ km/h}$.

Why other options are wrong:

- 810 multiplies instead of dividing.
- 80 and 270 are wrong values.

Final Answer: Speed = 90 km/h $\Rightarrow \boxed{\text{A}}$

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



Q29.

Solution

Concept — Train crossing a pole: The train covers its own length, so speed
 $= \frac{\text{length}}{\text{time}}.$

Step 1 — List the data: Length = 180 m, time = 6 s.

Step 2 — Divide: Speed = $\frac{180}{6} = 30$ m/s.

Why other options are wrong:

- 1080 multiplies the values.
- 180 and 6 are the given numbers, not the speed.

Final Answer: Speed = 30 m/s $\Rightarrow$ **D**

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

Q30.

Solution

Concept — Distance: Distance = speed $\times$ time.

Step 1 — List the data: Speed = 80 km/h, time = 2.5 h.

Step 2 — Multiply: Distance = $80 \times 2.5 = 200$ km.

Why other options are wrong:

- 160 uses time = 2 h.
- 320 uses time = 4 h, and 82.5 adds instead of multiplying.

Final Answer: Distance = 200 km $\Rightarrow$ **B**

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



Q31.

Solution

Concept — Boats and streams: Upstream speed = speed in still water – speed of stream.

Step 1 — List the data: Still water = 18 km/h, stream = 6 km/h.

Step 2 — Subtract: Upstream speed = $18 - 6 = 12$ km/h.

Why other options are wrong:

- 24 is the downstream speed (adds the stream).
- 6 and 3 are wrong values.

Final Answer: Upstream speed = 12 km/h $\Rightarrow$

Answer: (A) [Go Back to Q31](#)

Q32.

Solution

Concept — Isosceles triangle: A triangle with two equal sides also has the two angles opposite those sides equal.

Step 1 — Identify the equal sides: The two slant sides marked equal are the equal sides.

Step 2 — Count the equal angles: The angles at the base, opposite the equal sides, are equal, so two angles are equal.

Why other options are wrong:

- “three” equal angles describes an equilateral triangle.
- “one” and “none” contradict the isosceles property.

Final Answer: Two angles are equal $\Rightarrow$

Answer: (C) [Go Back to Q32](#)



Q33.

Solution

Concept — Pythagoras theorem: In a right triangle, $(\text{hypotenuse})^2 = (\text{leg})^2 + (\text{leg})^2$.

Step 1 — Square the legs: $5^2 = 25$ and $12^2 = 144$.

Step 2 — Add them: $25 + 144 = 169$.

Step 3 — Take the square root: $\sqrt{169} = 13$.

Why other options are wrong:

- 7 subtracts the legs, and 17 adds them.
- 60 multiplies them.

Final Answer: Hypotenuse = 13 cm $\Rightarrow$ **D**

Answer: (D) [Go Back to Q33](#)

Q34.

Solution

Concept — Linear pair: When two angles are formed on a straight line, they are a linear pair and their measures add to a straight angle.

Step 1 — Recall the straight angle: A straight angle is 180° .

Step 2 — Conclude: The two angles of a linear pair add up to 180° .

Why other options are wrong:

- 90° is for complementary angles.
- 360° is a full turn, and 270° is a reflex angle.

Final Answer: A linear pair adds to $180^\circ \Rightarrow$ **B**

Answer: (B) [Go Back to Q34](#)



Q35.

Solution

Concept — Radius and diameter: The radius of a circle is half its diameter.

Step 1 — Write the relation: $\text{Radius} = \frac{\text{diameter}}{2}$.

Step 2 — Substitute: $\text{Radius} = \frac{16}{2} = 8 \text{ cm}$.

Why other options are wrong:

- 32 doubles the diameter.
- 16 is the diameter itself, and 4 is a quarter.

Final Answer: Radius = 8 cm $\Rightarrow$

Answer: (A) [Go Back to Q35](#)

Q36.

Solution

Concept — Alternate exterior angles: When two parallel lines are cut by a transversal, the alternate exterior angles are equal.

Step 1 — Locate the angles: The two marked angles lie outside the parallel lines and on opposite sides of the transversal.

Step 2 — Apply the property: Such alternate exterior angles are always equal.

Why other options are wrong:

- “supplementary” is for co-interior angles.
- “complementary” and “zero” do not apply.

Final Answer: They are equal $\Rightarrow$

Answer: (C) [Go Back to Q36](#)



Q37.

Solution

Concept — Angles of a square: A square is a regular quadrilateral whose four angles are all equal.

Step 1 — Use the angle sum: The angles of a quadrilateral add to 360° .

Step 2 — Divide equally: Each interior angle = $\frac{360^\circ}{4} = 90^\circ$.

Why other options are wrong:

- 60° is an angle of an equilateral triangle.
- 120° and 45° are not the angles of a square.

Final Answer: Each interior angle = $90^\circ \Rightarrow \boxed{D}$

Answer: (D) [Go Back to Q37](#)

Q38.

Solution

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

Step 1 — Add the sides: length + breadth = $10 + 4 = 14$.

Step 2 — Multiply by 2: Perimeter = $2 \times 14 = 28$ cm.

Why other options are wrong:

- 40 is the area (10×4).
- 14 is the half-perimeter, and 24 is incorrect.

Final Answer: Perimeter = 28 cm $\Rightarrow \boxed{B}$

Answer: (B) [Go Back to Q38](#)



Q39.

Solution**Concept — Area of a square:** $\text{Area} = \text{side} \times \text{side} = \text{side}^2$.**Step 1 — Square the side:** $7 \times 7 = 49$.**Step 2 — Write the units:** $\text{Area} = 49 \text{ cm}^2$.**Why other options are wrong:**

- 28 is the perimeter (4×7).
- 14 and 21 are wrong products.

Final Answer: $\text{Area} = 49 \text{ cm}^2 \Rightarrow \boxed{\text{A}}$ **Answer: (A)** [Go Back to Q39](#)

Q40.

Solution**Concept — Circumference of a circle:** $\text{Circumference} = 2\pi r$.**Step 1 — Substitute:** $C = 2 \times \frac{22}{7} \times 21$.**Step 2 — Simplify $\frac{21}{7}$:** $\frac{22}{7} \times 21 = 22 \times 3 = 66$.**Step 3 — Multiply by 2:** $C = 2 \times 66 = 132 \text{ cm}$.**Why other options are wrong:**

- 66 is πr , missing the factor 2.
- 44 uses $r = 7$, and 1386 is the area.

Final Answer: $\text{Circumference} = 132 \text{ cm} \Rightarrow \boxed{\text{C}}$ **Answer: (C)** [Go Back to Q40](#)

Q41.

Solution

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

Step 1 — Multiply length and breadth: $5 \times 4 = 20$.

Step 2 — Multiply by the height: $20 \times 3 = 60 \text{ cm}^3$.

Why other options are wrong:

- 12 multiplies only two of the dimensions.
- 47 adds, and 120 doubles the answer.

Final Answer: $\text{Volume} = 60 \text{ cm}^3 \Rightarrow \boxed{\text{D}}$

Answer: (D) [Go Back to Q41](#)

Q42.

Solution

Concept — Volume of a cube: $\text{Volume} = \text{side}^3$.

Step 1 — Cube the side: $5^3 = 5 \times 5 \times 5$.

Step 2 — Compute: $5 \times 5 = 25$, then $25 \times 5 = 125 \text{ cm}^3$.

Why other options are wrong:

- 25 is 5^2 (an area), not the volume.
- 15 is 3×5 , and 75 is incorrect.

Final Answer: $\text{Volume} = 125 \text{ cm}^3 \Rightarrow \boxed{\text{B}}$

Answer: (B) [Go Back to Q42](#)

Q43.

Solution

Concept — Area of a triangle: $\text{Area} = \frac{1}{2} \times \text{base} \times \text{height}$.

Step 1 — Multiply base and height: $16 \times 5 = 80$.

Step 2 — Take half: $\frac{1}{2} \times 80 = 40 \text{ cm}^2$.

Why other options are wrong:



- 80 forgets the factor $\frac{1}{2}$.
- 21 adds the values, and 20 halves wrongly.

Final Answer: Area = $40 \text{ cm}^2 \Rightarrow \boxed{\text{A}}$

Answer: (A) [Go Back to Q43](#)

Q44.

Solution

Concept — Standard trigonometric values: The value of $\sin 60^\circ$ is a standard ratio.

Step 1 — Recall the value: $\sin 60^\circ = \frac{\sqrt{3}}{2}$.

Step 2 — Confirm: As the angle rises from 0° to 90° , the sine increases, and $\frac{\sqrt{3}}{2} \approx 0.87$.

Why other options are wrong:

- $\frac{1}{2}$ is $\sin 30^\circ$ and 1 is $\sin 90^\circ$.
- $\frac{1}{\sqrt{2}}$ is $\sin 45^\circ$.

Final Answer: $\sin 60^\circ = \frac{\sqrt{3}}{2} \Rightarrow \boxed{\text{C}}$

Answer: (C) [Go Back to Q44](#)

Q45.

Solution

Concept — Standard trigonometric values: The value of $\tan 0^\circ$ is a standard ratio.

Step 1 — Recall the value: $\tan 0^\circ = 0$.

Step 2 — Confirm: Since $\tan \theta = \frac{\sin \theta}{\cos \theta}$ and $\sin 0^\circ = 0$, the ratio is 0.

Why other options are wrong:

- 1 is $\tan 45^\circ$ and $\sqrt{3}$ is $\tan 60^\circ$.
- $\frac{1}{\sqrt{3}}$ is $\tan 30^\circ$.

Final Answer: $\tan 0^\circ = 0 \Rightarrow \boxed{\text{D}}$



Answer: (D) [Go Back to Q45](#)

Q46.

Solution

Concept — Standard trigonometric values: The value of $\cos 45^\circ$ is a standard ratio.

Step 1 — Recall the value: $\cos 45^\circ = \frac{1}{\sqrt{2}}$.

Step 2 — Confirm: At 45° , sine and cosine are equal, both $\frac{1}{\sqrt{2}} \approx 0.71$.

Why other options are wrong:

- $\frac{\sqrt{3}}{2}$ is $\cos 30^\circ$ and $\frac{1}{2}$ is $\cos 60^\circ$.
- 1 is $\cos 0^\circ$.

Final Answer: $\cos 45^\circ = \frac{1}{\sqrt{2}} \Rightarrow \boxed{\text{B}}$

Answer: (B) [Go Back to Q46](#)

Q47.

Solution

Concept — Height and distance: For a ladder making an angle with the ground,
 $\cos(\text{angle}) = \frac{\text{distance of foot from wall}}{\text{length of ladder}}$.

Step 1 — Write the relation: $\cos 60^\circ = \frac{4}{L}$.

Step 2 — Use $\cos 60^\circ = \frac{1}{2}$: $\frac{1}{2} = \frac{4}{L}$.

Step 3 — Solve for L : $L = 4 \times 2 = 8 \text{ m}$.

Why other options are wrong:

- 4 m is the distance of the foot, not the ladder.
- 2 m and $8\sqrt{3}$ m come from wrong ratios.

Final Answer: Length = 8 m $\Rightarrow \boxed{\text{A}}$

Answer: (A) [Go Back to Q47](#)



Q48.

Solution

Concept — Mean: $\text{Mean} = \frac{\text{sum of observations}}{\text{number of observations}}$.

Step 1 — Add the numbers: $3 + 6 + 9 + 12 + 15 = 45$.

Step 2 — Divide by the count: $\frac{45}{5} = 9$.

Why other options are wrong:

- 45 is the sum, not the mean.
- 12 is one of the values, and 6 is too small.

Final Answer: Mean = 9 $\Rightarrow$ **C**

Answer: (C) [Go Back to Q48](#)

Q49.

Solution

Concept — Mode: The mode is the value that occurs most often in the data.

Step 1 — Count the repetitions: 5 appears twice; 6, 7 and 8 each appear once.

Step 2 — Pick the most frequent: The value 5 occurs the most, so the mode is 5.

Why other options are wrong:

- 6, 7 and 8 each appear only once.

Final Answer: Mode = 5 $\Rightarrow$ **B**

Answer: (B) [Go Back to Q49](#)

Q50.

Solution

Concept — Probability: $\text{Probability} = \frac{\text{favourable outcomes}}{\text{total outcomes}}$.

Step 1 — Count the outcomes: A die has 6 outcomes; numbers greater than 4 are 5 and 6, giving 2 favourable outcomes.

Step 2 — Form and simplify the ratio: $\text{Probability} = \frac{2}{6} = \frac{1}{3}$.



Why other options are wrong:

- $\frac{1}{2}$ would need 3 favourable outcomes.
- $\frac{2}{3}$ and $\frac{1}{6}$ use wrong counts.

Final Answer: Probability = $\frac{1}{3} \Rightarrow$ D

Answer: (D) [Go Back to Q50](#)



Answer Key

Q	Ans	Q	Ans	Q	Ans	Q	Ans	Q	Ans
1	C	2	A	3	D	4	B	5	C
6	A	7	D	8	B	9	A	10	C
11	B	12	D	13	A	14	C	15	B
16	D	17	A	18	B	19	C	20	D
21	A	22	B	23	C	24	A	25	D
26	B	27	C	28	A	29	D	30	B
31	A	32	C	33	D	34	B	35	A
36	C	37	D	38	B	39	A	40	C
41	D	42	B	43	A	44	C	45	D
46	B	47	A	48	C	49	B	50	D

