

Jharkhand Polytechnic Mathematics

Sample Paper – 10

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 32 and 48 is:

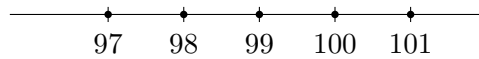
- (A) 8
- (B) 16
- (C) 96
- (D) 4

Q2. The LCM (lowest common multiple) of 9 and 15 is:

- (A) 45
- (B) 3
- (C) 135
- (D) 90



Q3. On the number line shown, the largest two-digit natural number is:



- (A) 90
- (B) 100
- (C) 98
- (D) 99

Q4. Out of the following, which number is rational?

- (A) $\sqrt{2}$
- (B) $\sqrt{5}$
- (C) $\sqrt{81}$
- (D) $\sqrt{7}$

Q5. The place value of the digit 2 in the number 1234 is:

- (A) 2
- (B) 200
- (C) 20
- (D) 2000

Q6. If $3x + 7 = 22$, then the value of x is:

- (A) 5
- (B) 15
- (C) 29
- (D) 7

Q7. The value of $(a + b)^2$ when $a = 6$ and $b = 2$ is:

- (A) 40



(B) 24

(C) 64

(D) 16

Q8. The factors of $x^2 - 144$ are:

(A) $(x - 12)(x - 12)$

(B) $(x - 72)(x + 2)$

(C) $(x - 6)(x + 24)$

(D) $(x - 12)(x + 12)$

Q9. If $15x = 45$, then x equals:

(A) 30

(B) 3

(C) 60

(D) 5

Q10. The roots of the quadratic equation $x^2 - 14x + 45 = 0$ are:

(A) 5, 9

(B) 3, 15

(C) $-5, -9$

(D) 1, 45

Q11. On simplifying, $9a + 9a$ equals:

(A) $81a$

(B) $18a^2$

(C) $18a$

(D) a

Q12. If $a = 5$, the value of $2a^2 + a$ is:



- (A) 105
- (B) 55
- (C) 25
- (D) 35

Q13. The ratio 50 : 75 in its simplest form is:

- (A) 3 : 2
- (B) 5 : 7
- (C) 50 : 75
- (D) 2 : 3

Q14. The average of 25, 50 and 75 is:

- (A) 50
- (B) 150
- (C) 75
- (D) 25

Q15. The mean proportional between 36 and 49 is:

- (A) 1764
- (B) 85
- (C) 42
- (D) 40

Q16. If $4 : 9 = 16 : x$, then the value of x is:

- (A) 21
- (B) 36
- (C) 64
- (D) 9



Q17. 70% of 300 is:

- (A) 70
- (B) 230
- (C) 21
- (D) 210

Q18. An article bought for Rs. 1500 is sold for Rs. 1800. The profit per cent is:

- (A) 20%
- (B) 30%
- (C) 15%
- (D) 25%

Q19. The fraction $\frac{23}{25}$ expressed as a percentage is:

- (A) 23%
- (B) 88%
- (C) 92%
- (D) 96%

Q20. An item marked at Rs. 4000 is sold at a discount of 25%. Its selling price is:

- (A) Rs. 1000
- (B) Rs. 3500
- (C) Rs. 5000
- (D) Rs. 3000

Q21. If 10% of a number is 12, then the number is:

- (A) 120
- (B) 1.2



- (C) 12
- (D) 1200

Q22. The simple interest on Rs. 7000 at 4% per annum for 2 years is:

- (A) Rs. 280
- (B) Rs. 560
- (C) Rs. 600
- (D) Rs. 5600

Q23. The compound interest on Rs. 5000 at 20% per annum for 2 years (compounded annually) is:

- (A) Rs. 2000
- (B) Rs. 7200
- (C) Rs. 1200
- (D) Rs. 2200

Q24. At what rate per annum will Rs. 3000 earn a simple interest of Rs. 540 in 3 years?

- (A) 5%
- (B) 9%
- (C) 6%
- (D) 18%

Q25. If A can complete a piece of work in 16 days, the part of the work A does in one day is:

- (A) $\frac{1}{16}$
- (B) 16
- (C) $\frac{1}{8}$
- (D) 8



- Q26.** A can do a work in 24 days and B can do the same work in 8 days. Working together, they finish it in:
- (A) 12 days
(B) 6 days
(C) 32 days
(D) 16 days
- Q27.** A tap can fill a tank in 25 hours. The part of the tank it fills in one hour is:
- (A) 25
(B) $\frac{1}{50}$
(C) $\frac{2}{25}$
(D) $\frac{1}{25}$
- Q28.** A car travels 540 km in 9 hours. Its average speed is:
- (A) 549 km/h
(B) 54 km/h
(C) 60 km/h
(D) 4860 km/h
- Q29.** A train 500 m long crosses a pole in 20 seconds. Its speed is:
- (A) 25 m/s
(B) 10000 m/s
(C) 520 m/s
(D) 50 m/s
- Q30.** The distance covered by a vehicle moving at 110 km/h in 3 hours is:
- (A) 110 km

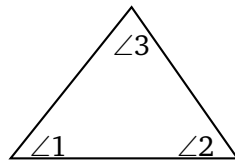


- (B) 330 km
- (C) 113 km
- (D) 220 km

Q31. The speed of a boat in still water is 28 km/h and the speed of the stream is 4 km/h. The upstream speed of the boat is:

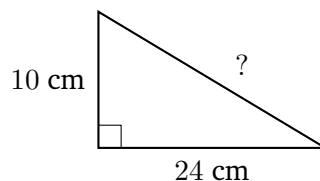
- (A) 32 km/h
- (B) 7 km/h
- (C) 112 km/h
- (D) 24 km/h

Q32. A triangle in which all three interior angles are less than 90° , like the one shown, is called:



- (A) right-angled triangle
- (B) obtuse-angled triangle
- (C) acute-angled triangle
- (D) straight triangle

Q33. In the right-angled triangle shown, the two legs are 10 cm and 24 cm. The length of the hypotenuse is:



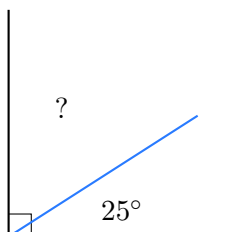
- (A) 34 cm
- (B) 26 cm



(C) 28 cm

(D) 32 cm

Q34. In the figure, a right angle is split into two complementary angles. If one of them is 25° , the other is:



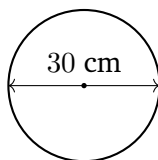
(A) 65°

(B) 75°

(C) 155°

(D) 25°

Q35. A circle has a diameter of 30 cm, as shown. Its radius is:



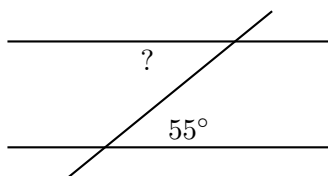
(A) 60 cm

(B) 30 cm

(C) 7.5 cm

(D) 15 cm

Q36. In the figure, two parallel lines are cut by a transversal. If one alternate interior angle is 55° , then its alternate interior angle is:

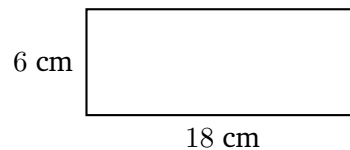


- (A) 125°
- (B) 35°
- (C) 55°
- (D) 90°

Q37. The measure of each interior angle of a regular pentagon is:

- (A) 120°
- (B) 108°
- (C) 90°
- (D) 72°

Q38. The perimeter of the rectangle shown, of length 18 cm and breadth 6 cm, is:



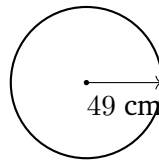
- (A) 48 cm
- (B) 108 cm
- (C) 24 cm
- (D) 96 cm

Q39. The area of a square of side 20 cm is:

- (A) 80 cm^2
- (B) 40 cm^2
- (C) 8000 cm^2
- (D) 400 cm^2

Q40. The circumference of a circle of radius 49 cm $\left(\text{take } \pi = \frac{22}{7}\right)$ is:





- (A) 154 cm
- (B) 308 cm
- (C) 7546 cm
- (D) 616 cm

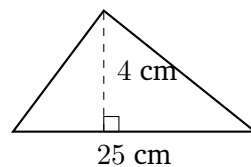
Q41. The volume of a cuboid of length 9 cm, breadth 4 cm and height 2 cm is:

- (A) 15 cm^3
- (B) 36 cm^3
- (C) 72 cm^3
- (D) 144 cm^3

Q42. The volume of a cube of side 9 cm is:

- (A) 729 cm^3
- (B) 81 cm^3
- (C) 243 cm^3
- (D) 486 cm^3

Q43. The area of the triangle shown, with base 25 cm and height 4 cm, is:



- (A) 100 cm^2
- (B) 29 cm^2
- (C) 200 cm^2



(D) 50 cm^2

Q44. The value of $2 \tan 45^\circ$ is:

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

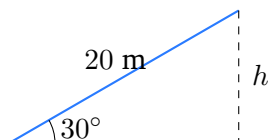
Q45. The value of $\sin 30^\circ + \cos 60^\circ$ is:

- (A) $\frac{1}{2}$
- (B) $\frac{\sqrt{3}}{2}$
- (C) 1
- (D) 0

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

- (A) 1
- (B) 2
- (C) 0
- (D) $\frac{1}{2}$

Q47. A kite is flying so that its string of length 20 m makes an angle of 30° with the ground, as shown. The height of the kite above the ground is:

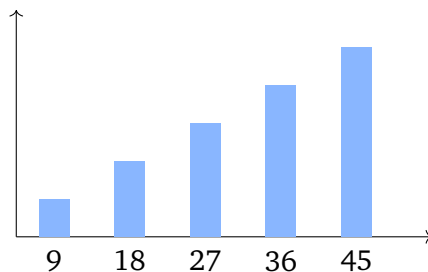


- (A) 20 m
- (B) $10\sqrt{3}$ m
- (C) 40 m



(D) 10 m

Q48. The data values 9, 18, 27, 36, 45 are shown as bars below. The mean of this data is:



- (A) 18
- (B) 27
- (C) 135
- (D) 36

Q49. The median of the data 7, 11, 15, 19, 23 is:

- (A) 15
- (B) 11
- (C) 19
- (D) 75

Q50. A fair die is rolled once. From the six faces shown, the shaded ones are divisible by 3. The probability of getting a number divisible by 3 is:



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



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 factors: Factors of 32 are 1, 2, 4, 8, 16, 32; factors of 48 are 1, 2, 3, 4, 6, 8, 12, 16, 24, 48.

Step 2 — Pick the greatest common one: The common factors are 1, 2, 4, 8, 16; the greatest is 16.

Why other options are wrong:

- 96 is the LCM, not the HCF.
- 8 and 4 are common factors but not the highest.

Final Answer: $\text{HCF} = 16 \Rightarrow \boxed{\text{B}}$

Answer: (B) [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 — Prime factorise: $9 = 3 \times 3 = 3^2$ and $15 = 3 \times 5$.

Step 2 — Take the highest powers: $\text{LCM} = 3^2 \times 5 = 9 \times 5 = 45$.

Why other options are wrong:

- 3 is the HCF, not the LCM.
- 135 and 90 are common multiples but not the smallest.

Final Answer: $\text{LCM} = 45 \Rightarrow \boxed{\text{A}}$

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



Q3.

Solution

Concept — Two-digit numbers: A two-digit number lies between 10 and 99, both included.

Step 1 — Find the upper limit: The largest number with exactly two digits is 99.

Step 2 — Check the next number: 100 has three digits, so it is not a two-digit number.

Why other options are wrong:

- 90 and 98 are two-digit numbers but not the largest.
- 100 is a three-digit number.

Final Answer: The largest two-digit number is 99 $\Rightarrow$ 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; the square root of a perfect square is rational.

Step 1 — Test each option: $\sqrt{2}$, $\sqrt{5}$ and $\sqrt{7}$ are roots of non-perfect squares, so their decimals never end or repeat.

Step 2 — Identify the rational one: $\sqrt{81} = 9$, which is a whole number, hence rational.

Why other options are wrong:

- $\sqrt{2}$, $\sqrt{5}$ and $\sqrt{7}$ are all irrational numbers.

Final Answer: $\sqrt{81} = 9$ is rational $\Rightarrow$ C

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



Q5.

Solution

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

Step 1 — Locate the digit: In 1234, the digit 2 is in the hundreds place.

Step 2 — Multiply: Place value = $2 \times 100 = 200$.

Why other options are wrong:

- 2 is the face value, not the place value.
- 20 and 2000 use the wrong place.

Final Answer: Place value = 200 $\Rightarrow$ B

Answer: (B) [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 — Subtract 7 from both sides: $3x = 22 - 7 = 15$.

Step 2 — Divide by 3: $x = \frac{15}{3} = 5$.

Why other options are wrong:

- 15 forgets to divide by 3.
- 29 adds 7 instead of subtracting.
- 7 is the constant, not x .

Final Answer: $x = 5 \Rightarrow$ A

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: $a + b = 6 + 2 = 8$.

Step 2 — Square the sum: $(8)^2 = 64$.

Why other options are wrong:

- $40 = a^2 + b^2$ forgets the $2ab$ term.
- 24 is only $2ab$.
- 16 squares b wrongly.

Final Answer: $(a + b)^2 = 64 \Rightarrow \boxed{\text{C}}$

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

Q8.

Solution

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

Step 1 — Write 144 as a square: $x^2 - 144 = x^2 - 12^2$.

Step 2 — Apply the identity: $x^2 - 12^2 = (x - 12)(x + 12)$.

Why other options are wrong:

- $(x - 12)(x - 12) = x^2 - 24x + 144$, which is wrong.
- The other pairs do not multiply back to $x^2 - 144$.

Final Answer: $x^2 - 144 = (x - 12)(x + 12) \Rightarrow \boxed{\text{D}}$

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



Q9.

Solution**Concept — Simple equation:** Divide both sides by the coefficient of x .**Step 1 — Divide by 15:** $x = \frac{45}{15}$.**Step 2 — Compute:** $x = 3$.**Why other options are wrong:**

- 30 subtracts instead of dividing.
- 60 adds the numbers.
- 5 uses a wrong divisor.

Final Answer: $x = 3 \Rightarrow$ BAnswer: (B) [Go Back to Q9](#)

Q10.

Solution**Concept — Quadratic roots:** Factorise so that the two numbers multiply to $+45$ and add to -14 .**Step 1 — Split the middle term:** $x^2 - 14x + 45 = (x - 5)(x - 9)$.**Step 2 — Set each factor to zero:** $x - 5 = 0$ or $x - 9 = 0$, giving $x = 5$ or $x = 9$.**Why other options are wrong:**

- 3, 15 multiply to 45 but add to 18, not 14.
- $-5, -9$ would need $x^2 + 14x + 45$.
- 1, 45 do not satisfy the equation.

Final Answer: Roots are 5 and 9 $\Rightarrow$ AAnswer: (A) [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: $9 + 9 = 18$.

Step 2 — Attach the variable: $9a + 9a = 18a$.

Why other options are wrong:

- $81a$ multiplies the coefficients.
- $18a^2$ wrongly multiplies the variables too.
- a ignores the coefficients.

Final Answer: $9a + 9a = 18a \Rightarrow$ C

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

Q12.

Solution

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

Step 1 — Square first: $a^2 = 5^2 = 25$.

Step 2 — Multiply by 2: $2 \times 25 = 50$.

Step 3 — Add a : $50 + 5 = 55$.

Why other options are wrong:

- 105 uses $(2a)^2 + a$.
- 25 is only a^2 .
- 35 comes from a wrong computation.

Final Answer: $2a^2 + a = 55 \Rightarrow$ B

Answer: (B) [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 50 and 75 is 25.**Step 2 — Divide both terms:** $\frac{50}{25} : \frac{75}{25} = 2 : 3$.**Why other options are wrong:**

- 3 : 2 reverses the ratio.
- 50 : 75 is not in simplest form.
- 5 : 7 is incorrect.

Final Answer: $50 : 75 = 2 : 3 \Rightarrow$ DAnswer: (D) [Go Back to Q13](#)

Q14.

Solution**Concept — Average:** $\text{Average} = \frac{\text{sum of values}}{\text{number of values}}$.**Step 1 — Add the values:** $25 + 50 + 75 = 150$.**Step 2 — Divide by the count:** $\frac{150}{3} = 50$.**Why other options are wrong:**

- 150 is the sum, not the average.
- 75 is the largest value.
- 25 is the smallest value.

Final Answer: $\text{Average} = 50 \Rightarrow$ AAnswer: (A) [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: $36 \times 49 = 1764$.

Step 2 — Take the square root: $\sqrt{1764} = \sqrt{36} \times \sqrt{49} = 6 \times 7 = 42$.

Why other options are wrong:

- 1764 is the product, not its square root.
- 85 adds the numbers.
- 40 is a wrong estimate.

Final Answer: Mean proportional = 42 $\Rightarrow$ **C**

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

Q16.

Solution

Concept — Proportion: In $a : b = c : x$, the product of the means equals the product of the extremes, so $a \times x = b \times c$.

Step 1 — Write the cross product: $4 \times x = 9 \times 16$.

Step 2 — Compute the right side: $4x = 144$.

Step 3 — Solve for x : $x = \frac{144}{4} = 36$.

Why other options are wrong:

- 21, 64 and 9 do not satisfy the proportion.

Final Answer: $x = 36 \Rightarrow$ **B**

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



Q17.

Solution

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

Step 1 — Write the fraction: $70\% = \frac{70}{100} = \frac{7}{10}$.

Step 2 — Multiply: $\frac{7}{10} \times 300 = 7 \times 30 = 210$.

Why other options are wrong:

- 70 is the percentage value, not the result.
- 230 and 21 use wrong operations.

Final Answer: 70% of $300 = 210 \Rightarrow \boxed{\text{D}}$

Answer: (D) [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: $\text{Profit} = 1800 - 1500 = 300$.

Step 2 — Apply the formula: $\text{Profit}\% = \frac{300}{1500} \times 100 = 20\%$.

Why other options are wrong:

- 30% and 15% use wrong numbers.
- 25% would need a profit of 375.

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

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



Q19.

Solution

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

Step 1 — Multiply by 100: $\frac{23}{25} \times 100 = 23 \times 4 = 92$.

Step 2 — Add the sign: $\frac{23}{25} = 92\%$.

Why other options are wrong:

- 23% ignores the denominator.
- 88% and 96% use a wrong multiplier.

Final Answer: $\frac{23}{25} = 92\% \Rightarrow \boxed{\text{C}}$

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: 25% of 4000 = $\frac{25}{100} \times 4000 = 1000$.

Step 2 — Subtract: Selling price = 4000 – 1000 = 3000.

Why other options are wrong:

- Rs. 1000 is the discount itself.
- Rs. 5000 adds the discount.
- Rs. 3500 uses a wrong discount.

Final Answer: Selling price = Rs. 3000 $\Rightarrow \boxed{\text{D}}$

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



Q21.

Solution

Concept — Reverse percentage: If 10% of a number is 12, then the whole number is found by scaling up.

Step 1 — Write the equation: $\frac{10}{100} \times x = 12$.

Step 2 — Solve for x : $x = \frac{12 \times 100}{10} = 120$.

Why other options are wrong:

- 1.2 divides instead of multiplying.
- 12 is 10% of the number, not the number.
- 1200 multiplies by 100 wrongly.

Final Answer: The number is 120 $\Rightarrow$ **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: $P = 7000$, $R = 4$, $T = 2$.

Step 2 — Substitute: $SI = \frac{7000 \times 4 \times 2}{100}$.

Step 3 — Compute: $SI = \frac{56000}{100} = 560$.

Why other options are wrong:

- Rs. 280 uses $T = 1$.
- Rs. 600 is a wrong rounding.
- Rs. 5600 omits the 100.

Final Answer: $SI = \text{Rs. } 560 \Rightarrow$ **B**

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



Q23.

Solution

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

Step 1 — Find the amount: $A = 5000 \left(1 + \frac{20}{100}\right)^2 = 5000 \times (1.2)^2$.

Step 2 — Compute the power: $(1.2)^2 = 1.44$, so $A = 5000 \times 1.44 = 7200$.

Step 3 — Subtract the principal: CI = $7200 - 5000 = 2200$.

Why other options are wrong:

- Rs. 2000 is the simple interest.
- Rs. 7200 is the total amount, not the interest.
- Rs. 1200 uses only one year.

Final Answer: CI = Rs. 2200 $\Rightarrow$ D

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

Q24.

Solution

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

Step 1 — List the data: SI = 540, $P = 3000$, $T = 3$.

Step 2 — Substitute: $R = \frac{540 \times 100}{3000 \times 3}$.

Step 3 — Compute: $R = \frac{54000}{9000} = 6\%$.

Why other options are wrong:

- 5%, 9% and 18% do not give Rs. 540 interest.

Final Answer: Rate = 6% $\Rightarrow$ C

Answer: (C) [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 $n = 16$: One day's work = $\frac{1}{16}$.

Step 2 — Confirm: In 16 days, $16 \times \frac{1}{16} = 1$ whole work.

Why other options are wrong:

- 16 and 8 are not fractions of work.
- $\frac{1}{8}$ would mean finishing in 8 days.

Final Answer: One day's work = $\frac{1}{16} \Rightarrow \boxed{A}$

Answer: (A) [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 $\frac{1}{24}$, B does $\frac{1}{8}$.

Step 2 — Add them: $\frac{1}{24} + \frac{1}{8} = \frac{1}{24} + \frac{3}{24} = \frac{4}{24} = \frac{1}{6}$.

Step 3 — Take the reciprocal: Time together = 6 days.

Why other options are wrong:

- 12 and 32 come from wrong addition.
- 16 is not the reciprocal of $\frac{1}{6}$.

Final Answer: They finish in 6 days $\Rightarrow \boxed{B}$

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



Q27.

Solution

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

Step 1 — Apply with $n = 25$: One hour's filling = $\frac{1}{25}$.

Step 2 — Confirm: In 25 hours, $25 \times \frac{1}{25} = 1$ full tank.

Why other options are wrong:

- 25 is the number of hours, not the part.
- $\frac{1}{50}$ and $\frac{2}{25}$ are wrong fractions.

Final Answer: One hour's work = $\frac{1}{25} \Rightarrow \boxed{\text{D}}$

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

Q28.

Solution

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

Step 1 — List the data: distance = 540 km, time = 9 h.

Step 2 — Divide: $\text{Speed} = \frac{540}{9} = 60 \text{ km/h}$.

Why other options are wrong:

- 549 adds instead of dividing.
- 54 uses a wrong divisor.
- 4860 multiplies the values.

Final Answer: Speed = 60 km/h $\Rightarrow \boxed{\text{C}}$

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



Q29.

Solution

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

Step 1 — List the data: length = 500 m, time = 20 s.

Step 2 — Divide: $\text{Speed} = \frac{500}{20} = 25 \text{ m/s}$.

Why other options are wrong:

- 10000 multiplies the values.
- 520 adds them.
- 50 uses a wrong divisor.

Final Answer: Speed = 25 m/s $\Rightarrow$ **A**

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

Q30.

Solution

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

Step 1 — List the data: speed = 110 km/h, time = 3 h.

Step 2 — Multiply: Distance = $110 \times 3 = 330 \text{ km}$.

Why other options are wrong:

- 110 ignores the time.
- 113 adds instead of multiplying.
- 220 uses a wrong time.

Final Answer: Distance = 330 km $\Rightarrow$ **B**

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



Q31.

Solution

Concept — Upstream speed: Going upstream, the stream opposes the boat, so upstream speed = boat speed – stream speed.

Step 1 — Subtract the speeds: $28 - 4 = 24$ km/h.

Step 2 — State the result: Upstream speed = 24 km/h.

Why other options are wrong:

- 32 km/h is the downstream speed ($28 + 4$).
- 112 multiplies and 7 divides the values.

Final Answer: Upstream speed = 24 km/h $\Rightarrow$ D

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

Q32.

Solution

Concept — Types of triangles by angle: A triangle in which every interior angle is less than 90° is an acute-angled triangle.

Step 1 — Check the angles: All three angles $\angle 1, \angle 2, \angle 3$ are less than 90° .

Step 2 — Name the triangle: Such a triangle is called an acute-angled triangle.

Why other options are wrong:

- A right-angled triangle has one 90° angle.
- An obtuse-angled triangle has one angle greater than 90° .
- “Straight triangle” is not a valid type.

Final Answer: It is an acute-angled triangle $\Rightarrow$ C

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



Q33.

Solution

Concept — Pythagoras theorem: In a right triangle, $(\text{hypotenuse})^2 = (\text{leg}_1)^2 + (\text{leg}_2)^2$.

Step 1 — Square the legs: $10^2 + 24^2 = 100 + 576 = 676$.

Step 2 — Take the square root: Hypotenuse = $\sqrt{676} = 26$ cm.

Why other options are wrong:

- 34 simply adds the two legs.
- 28 and 32 do not satisfy the theorem.

Final Answer: Hypotenuse = 26 cm $\Rightarrow$ **B**

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

Q34.

Solution

Concept — Complementary angles: Two angles are complementary when their measures add up to 90° .

Step 1 — Write the relation: First angle + second angle = 90° .

Step 2 — Subtract: Second angle = $90^\circ - 25^\circ = 65^\circ$.

Why other options are wrong:

- 75° subtracts from a wrong total.
- 155° would make them supplementary (180°).
- 25° just repeats the given angle.

Final Answer: The other angle is $65^\circ \Rightarrow$ **A**

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



Q35.

Solution

Concept — Radius and diameter: The radius of a circle is half its diameter,
 $r = \frac{d}{2}$.

Step 1 — List the diameter: $d = 30$ cm.

Step 2 — Halve it: $r = \frac{30}{2} = 15$ cm.

Why other options are wrong:

- 60 doubles the diameter.
- 30 is the diameter itself.
- 7.5 halves the diameter twice.

Final Answer: Radius = 15 cm $\Rightarrow$ **D**

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

Q36.

Solution

Concept — Alternate interior angles: When a transversal cuts two parallel lines, the alternate interior angles are equal.

Step 1 — Identify the pair: The two marked angles lie on opposite sides of the transversal, between the parallel lines.

Step 2 — Apply the property: Therefore the alternate interior angle = 55° .

Why other options are wrong:

- 125° would be the co-interior (allied) angle.
- 35° and 90° have no such relation here.

Final Answer: The alternate interior angle = $55^\circ \Rightarrow$ **C**

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



Q37.

Solution

Concept — Interior angle of a regular polygon: Each interior angle = $\frac{(n-2) \times 180^\circ}{n}$, where n is the number of sides.

Step 1 — Use $n = 5$: Sum of interior angles = $(5-2) \times 180^\circ = 3 \times 180^\circ = 540^\circ$.

Step 2 — Divide by 5: Each interior angle = $\frac{540^\circ}{5} = 108^\circ$.

Why other options are wrong:

- 120° is for a regular hexagon.
- 90° is for a square.
- 72° is the exterior angle of the pentagon.

Final Answer: Each interior angle = $108^\circ \Rightarrow$ **B**

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

Q38.

Solution

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

Step 1 — Add length and breadth: $18 + 6 = 24$.

Step 2 — Multiply by 2: Perimeter = $2 \times 24 = 48$ cm.

Why other options are wrong:

- 108 is the area (18×6).
- 24 is only the half-perimeter.
- 96 doubles the perimeter.

Final Answer: Perimeter = 48 cm $\Rightarrow$ **A**

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



Q39.

Solution**Concept — Area of a square:** $\text{Area} = \text{side} \times \text{side} = \text{side}^2$.**Step 1 — List the side:** $\text{side} = 20 \text{ cm}$.**Step 2 — Square it:** $\text{Area} = 20 \times 20 = 400 \text{ cm}^2$.**Why other options are wrong:**

- 80 is the perimeter (4×20).
- 40 doubles the side.
- 8000 uses a wrong operation.

Final Answer: $\text{Area} = 400 \text{ cm}^2 \Rightarrow \boxed{\text{D}}$ **Answer: (D)** [Go Back to Q39](#)

Q40.

Solution**Concept — Circumference of a circle:** $\text{Circumference} = 2\pi r$.**Step 1 — Substitute:** $C = 2 \times \frac{22}{7} \times 49$.**Step 2 — Simplify the 7:** $\frac{49}{7} = 7$, so $C = 2 \times 22 \times 7$.**Step 3 — Compute:** $C = 44 \times 7 = 308 \text{ cm}$.**Why other options are wrong:**

- 154 is πr , only half of $2\pi r$.
- 7546 is the area (πr^2).
- 616 uses a wrong factor.

Final Answer: $\text{Circumference} = 308 \text{ cm} \Rightarrow \boxed{\text{B}}$ **Answer: (B)** [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: $9 \times 4 = 36$.

Step 2 — Multiply by the height: $36 \times 2 = 72 \text{ cm}^3$.

Why other options are wrong:

- 15 adds the dimensions.
- 36 forgets the height.
- 144 doubles the volume.

Final Answer: $\text{Volume} = 72 \text{ cm}^3 \Rightarrow \boxed{\text{C}}$

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

Q42.

Solution

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

Step 1 — List the side: $\text{side} = 9 \text{ cm}$.

Step 2 — Cube it: $\text{Volume} = 9 \times 9 \times 9 = 729 \text{ cm}^3$.

Why other options are wrong:

- 81 is side^2 (the area of a face).
- 243 and 486 use wrong operations.

Final Answer: $\text{Volume} = 729 \text{ cm}^3 \Rightarrow \boxed{\text{A}}$

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



Q43.

Solution

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

Step 1 — List the data: base = 25 cm, height = 4 cm.

Step 2 — Substitute: $\text{Area} = \frac{1}{2} \times 25 \times 4$.

Step 3 — Compute: $\frac{1}{2} \times 100 = 50 \text{ cm}^2$.

Why other options are wrong:

- 100 forgets the factor $\frac{1}{2}$.
- 29 adds base and height.
- 200 doubles the product.

Final Answer: $\text{Area} = 50 \text{ cm}^2 \Rightarrow \boxed{\text{D}}$

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

Q44.

Solution

Concept — Standard trigonometric values: $\tan 45^\circ$ is a standard ratio equal to 1.

Step 1 — Recall the value: $\tan 45^\circ = 1$.

Step 2 — Multiply by 2: $2 \tan 45^\circ = 2 \times 1 = 2$.

Why other options are wrong:

- 1 forgets to multiply by 2.
- $\frac{1}{2}$ divides instead of multiplying.
- $\sqrt{3}$ is $\tan 60^\circ$.

Final Answer: $2 \tan 45^\circ = 2 \Rightarrow \boxed{\text{B}}$

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



Q45.

Solution

Concept — Standard trigonometric values: $\sin 30^\circ = \frac{1}{2}$ and $\cos 60^\circ = \frac{1}{2}$.

Step 1 — Write the values: $\sin 30^\circ + \cos 60^\circ = \frac{1}{2} + \frac{1}{2}$.

Step 2 — Add: $\frac{1}{2} + \frac{1}{2} = 1$.

Why other options are wrong:

- $\frac{1}{2}$ adds only one of the terms.
- $\frac{\sqrt{3}}{2}$ and 0 use wrong values.

Final Answer: $\sin 30^\circ + \cos 60^\circ = 1 \Rightarrow \boxed{\text{C}}$

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

Q46.

Solution

Concept — Standard trigonometric values: $\tan 45^\circ = 1$.

Step 1 — Write the product: $\tan 45^\circ \times \tan 45^\circ = 1 \times 1$.

Step 2 — Multiply: $1 \times 1 = 1$.

Why other options are wrong:

- 2 adds the values instead of multiplying.
- 0 and $\frac{1}{2}$ use wrong values.

Final Answer: $\tan 45^\circ \times \tan 45^\circ = 1 \Rightarrow \boxed{\text{A}}$

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



Q47.

Solution

Concept — Height and distance: In the right triangle formed, $\sin(\text{angle}) = \frac{\text{height}}{\text{string length}}$.

Step 1 — Write the relation: $\sin 30^\circ = \frac{h}{20}$.

Step 2 — Use $\sin 30^\circ = \frac{1}{2}$: $\frac{1}{2} = \frac{h}{20}$.

Step 3 — Solve for h : $h = \frac{1}{2} \times 20 = 10$ m.

Why other options are wrong:

- 20 m is the string length, not the height.
- $10\sqrt{3}$ would use $\sin 60^\circ$.
- 40 doubles the string length.

Final Answer: Height = 10 m $\Rightarrow$ D

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

Q48.

Solution

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

Step 1 — Add the numbers: $9 + 18 + 27 + 36 + 45 = 135$.

Step 2 — Divide by the count: $\frac{135}{5} = 27$.

Why other options are wrong:

- 135 is the sum, not the mean.
- 18 and 36 are individual values.

Final Answer: Mean = 27 $\Rightarrow$ B

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



Q49.

Solution

Concept — Median: The median is the middle value when the data is arranged in order. For an odd number of values, it is the exact middle one.

Step 1 — Arrange in order: 7, 11, 15, 19, 23 (already increasing).

Step 2 — Find the middle: There are 5 values, so the 3rd value is the median, which is 15.

Why other options are wrong:

- 11 and 19 are not in the middle position.
- 75 is the sum of all the values.

Final Answer: Median = 15 $\Rightarrow$ A

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

Q50.

Solution

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

Step 1 — List the outcomes: A die shows 1, 2, 3, 4, 5, 6, so the total is 6.

Step 2 — Count the favourable ones: Numbers divisible by 3 are 3 and 6, so there are 2.

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

Why other options are wrong:

- $\frac{1}{2}$ would count 3 favourable outcomes.
- $\frac{1}{6}$ counts only one outcome.
- $\frac{2}{3}$ counts four outcomes.

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

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



Answer Key

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

