

TALLENTEX Mathematics

Sample Paper – 9

Duration: 23 Minutes

Maximum Marks: 60

Instructions

- This paper contains **15 MCQ** questions with a **single correct answer**, modelled on the Mathematics portion of **TALLENTEX**.
- Marking scheme: **+4** for correct answer, **–1** for incorrect answer, **0** for unattempted.
- Only **one** option is correct for each question.
- Syllabus: **NCERT Class 8 and Class 9 Mathematics**.
- **No** mobile phones, calculators, or electronic gadgets are allowed in the examination hall.

Q1. Simplify: $\frac{-3}{4} + \frac{5}{6}$.

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

Q2. Find the value of $\sqrt[3]{-2197}$.

- (A) 13
- (B) –13
- (C) –11
- (D) 11

Q3. A car travels 90 km in 2 hours at a constant speed. How far will it travel in 5 hours?

- (A) 180 km
- (B) 200 km
- (C) 225 km



(D) 250 km

Q4. A shopkeeper marks a shirt at Rs. 800 and gives a 15% discount. Find the selling price.

(A) Rs. 600

(B) Rs. 620

(C) Rs. 650

(D) Rs. 680

Q5. Find the solution of the system: $2x + y = 10$ and $x - y = 2$.

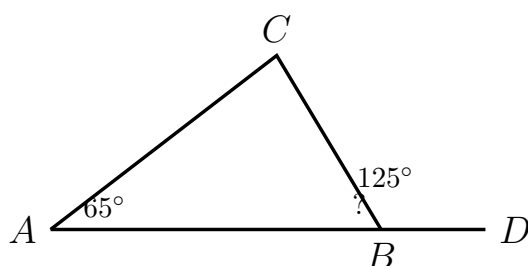
(A) (4, 2)

(B) (3, 4)

(C) (5, 0)

(D) (2, 6)

Q6. In the figure, an exterior angle of $\triangle ABC$ at vertex C is $\angle ACD = 125^\circ$. If $\angle BAC = 65^\circ$, find $\angle ABC$.



(A) 55°

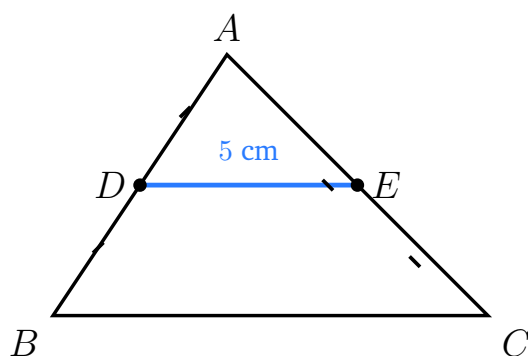
(B) 60°

(C) 65°

(D) 70°

Q7. In $\triangle ABC$, D and E are the mid-points of sides AB and AC respectively. If $DE = 5$ cm, find BC .



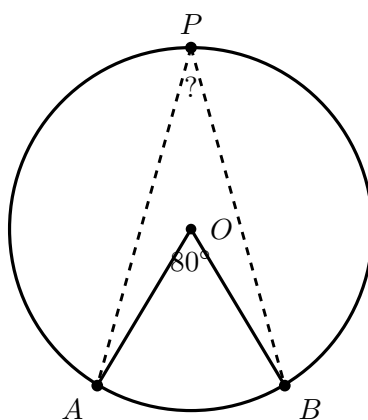


- (A) 5 cm
- (B) 7.5 cm
- (C) 10 cm
- (D) 12.5 cm

Q8. In parallelogram $ABCD$, $\angle A = 70^\circ$. Find $\angle C$.

- (A) 110°
- (B) 100°
- (C) 90°
- (D) 70°

Q9. Arc AB of a circle with centre O subtends an angle of 80° at O . What is the angle subtended by the same arc at a point P on the major arc?



- (A) 40°
- (B) 80°



(C) 160°

(D) 20°

Q10. Using Heron's formula, find the area of a triangle with sides 13 cm, 14 cm, and 15 cm.

(A) 72 cm^2

(B) 84 cm^2

(C) 96 cm^2

(D) 100 cm^2

Q11. Find the total surface area of a sphere of radius 7 cm. (Use $\pi = \frac{22}{7}$.)

(A) 462 cm^2

(B) 528 cm^2

(C) 616 cm^2

(D) 704 cm^2

Q12. The mean of 5 observations is 12. One observation of value 10 is replaced by 18. Find the new mean.

(A) 12.6

(B) 13.0

(C) 13.2

(D) 13.6

Q13. A bag contains 4 red, 3 blue, and 5 green marbles. One marble is drawn at random. What is the probability that it is *not* green?

(A) $\frac{7}{12}$

(B) $\frac{5}{12}$

(C) $\frac{1}{3}$



(D) $\frac{2}{3}$

Q14. Find the mid-point of the segment joining $A(3, -5)$ and $B(7, 9)$.

(A) $(5, 4)$

(B) $(5, 2)$

(C) $(4, 2)$

(D) $(4, 7)$

Q15. Find the product of the zeroes of $p(x) = 2x^2 - 5x + 3$.

(A) $\frac{5}{2}$

(B) $-\frac{5}{2}$

(C) $\frac{3}{2}$

(D) $-\frac{3}{2}$



Detailed Solutions

Q1.

Solution

Concept — Rational Numbers (Addition): To add fractions with different denominators, find the LCM, convert, then add.

Step 1 — Find LCM(4, 6). $\text{LCM}(4, 6) = 12$.

Step 2 — Convert to a common denominator.

$$\frac{-3}{4} = \frac{-9}{12}, \quad \frac{5}{6} = \frac{10}{12}.$$

Step 3 — Add.

$$\frac{-9}{12} + \frac{10}{12} = \frac{1}{12}.$$

Why other options are wrong:

- Option B: $-\frac{1}{12}$ results from a sign error (treating $+\frac{5}{6}$ as $-\frac{5}{6}$).
- Option C: $\frac{1}{6}$ comes from using $\text{LCM} = 6$ without converting the first fraction correctly.
- Option D: $-\frac{1}{6}$ combines both the sign error and the LCM error.

Final Answer: $\frac{-3}{4} + \frac{5}{6} = \frac{1}{12} \Rightarrow \boxed{\text{A}}$

Answer: (A) [Go Back to Q 1](#)

Q2.

Solution

Concept — Cubes and Cube Roots: $\sqrt[3]{-n^3} = -n$. The cube root of a negative number is negative.

Step 1 — Recognise the perfect cube. $13^3 = 2197$, so $(-13)^3 = -2197$.

Step 2 — Apply cube root.

$$\sqrt[3]{-2197} = \sqrt[3]{(-13)^3} = -13.$$

Why other options are wrong:

- Option A: 13 is $\sqrt[3]{2197}$ (positive), not $\sqrt[3]{-2197}$.



- Option C: $(-11)^3 = -1331 \neq -2197$.
- Option D: $11^3 = 1331 \neq 2197$.

Final Answer: $\sqrt[3]{-2197} = -13 \Rightarrow \boxed{\text{B}}$

Answer: (B) [Go Back to Q 2](#)

Q3.

Solution

Concept — Direct Proportion: At constant speed, distance is directly proportional to time: $d = v \times t$.

Step 1 — Find the speed.

$$v = \frac{90 \text{ km}}{2 \text{ h}} = 45 \text{ km/h.}$$

Step 2 — Find distance in 5 hours.

$$d = 45 \times 5 = 225 \text{ km.}$$

Why other options are wrong:

- Option A: $180 = 90 \times 2$ — mistakenly doubled the original distance.
- Option B: 200 would require a speed of 40 km/h, not 45 km/h.
- Option D: 250 would require a speed of 50 km/h, not 45 km/h.

Final Answer: Distance = 225 km $\Rightarrow \boxed{\text{C}}$

Answer: (C) [Go Back to Q 3](#)

Q4.

Solution

Concept — Discount:

$$\text{Selling Price} = \text{Marked Price} \times \frac{100 - \text{Discount}\%}{100}.$$

Step 1 — Substitute the values.

$$\text{SP} = 800 \times \frac{85}{100} = 800 \times 0.85 = \text{Rs. } 680.$$



Why other options are wrong:

- Option A: Rs. 600 would require a 25% discount.
- Option B: Rs. 620 implies a discount of Rs. 180, i.e., 22.5%.
- Option C: Rs. 650 implies a discount of Rs. 150, i.e., 18.75%.

Final Answer: Selling Price = Rs. 680 $\Rightarrow$ D

Answer: (D) [Go Back to Q 4](#)

Q5.

Solution

Concept — Elimination Method: Add or subtract equations to eliminate one variable.

Step 1 — Add the two equations.

$$(2x + y) + (x - y) = 10 + 2 \implies 3x = 12 \implies x = 4.$$

Step 2 — Substitute into the first equation.

$$2(4) + y = 10 \implies y = 2.$$

Step 3 — Verify in both equations. $8 + 2 = 10$ ✓ and $4 - 2 = 2$ ✓.

Why other options are wrong:

- Option B: $(3, 4)$: $3 - 4 = -1 \neq 2$.
- Option C: $(5, 0)$: $5 - 0 = 5 \neq 2$.
- Option D: $(2, 6)$: $2 - 6 = -4 \neq 2$.

Final Answer: $(x, y) = (4, 2) \Rightarrow$ A

Answer: (A) [Go Back to Q 5](#)



Q6.

Solution

Concept — Exterior Angle Theorem: An exterior angle of a triangle equals the sum of the two remote interior angles:

$$\angle ACD = \angle BAC + \angle ABC.$$

Step 1 — Substitute and solve.

$$125^\circ = 65^\circ + \angle ABC \implies \angle ABC = 60^\circ.$$

Step 2 — Verify. Third angle $\angle BCA = 180^\circ - 65^\circ - 60^\circ = 55^\circ$. Exterior angle $= 180^\circ - 55^\circ = 125^\circ \checkmark$.

Why other options are wrong:

- Option A: $55^\circ = \angle BCA$, the interior angle at C , not the required angle.
- Option C: $65^\circ = \angle BAC$, which was already given.
- Option D: 70° gives exterior angle $= 65^\circ + 70^\circ = 135^\circ \neq 125^\circ$.

Final Answer: $\angle ABC = 60^\circ \Rightarrow$ B

Answer: (B) [Go Back to Q 6](#)

Q7.

Solution

Concept — Mid-Point Theorem: The segment joining the mid-points of two sides of a triangle is parallel to the third side and half its length:

$$DE \parallel BC \quad \text{and} \quad DE = \frac{1}{2} BC.$$

Step 1 — Apply the theorem.

$$BC = 2 \times DE = 2 \times 5 = 10 \text{ cm}.$$

Why other options are wrong:

- Option A: 5 cm would mean $BC = DE$, contradicting the theorem.
- Option B: $7.5 = 1.5 \times DE$ has no geometric basis.
- Option D: $12.5 = 2.5 \times DE$ is also incorrect.



Final Answer: $BC = 10 \text{ cm} \Rightarrow \boxed{\text{C}}$

Answer: (C) [Go Back to Q 7](#)

Q8.

Solution

Concept — Parallelogram Properties: Opposite angles of a parallelogram are equal.

Step 1 — Identify opposite angles. $\angle A$ and $\angle C$ are opposite angles in parallelogram $ABCD$.

Step 2 — Apply the property.

$$\angle C = \angle A = 70^\circ.$$

Step 3 — Verify angle sum. Adjacent angle: $\angle B = 180^\circ - 70^\circ = 110^\circ$. Total: $2(70^\circ) + 2(110^\circ) = 360^\circ \checkmark$.

Why other options are wrong:

- Option A: $110^\circ = \angle B = \angle D$ (adjacent angles, not opposite).
- Option B: 100° is not consistent with any standard property here.
- Option C: 90° would make it a rectangle, requiring all angles to be 90° .

Final Answer: $\angle C = 70^\circ \Rightarrow \boxed{\text{D}}$

Answer: (D) [Go Back to Q 8](#)

Q9.

Solution

Concept — Inscribed Angle Theorem: The angle subtended by an arc at any point on the remaining circle is half the angle subtended at the centre by the same arc.

$$\angle APB = \frac{1}{2} \angle AOB.$$

Step 1 — Apply the theorem.

$$\angle APB = \frac{1}{2} \times 80^\circ = 40^\circ.$$



Why other options are wrong:

- Option B: 80° is the central angle itself, not the inscribed angle.
- Option C: $160^\circ = 2 \times 80^\circ$ — confuses the half-angle rule direction.
- Option D: $20^\circ = 80^\circ/4$ — has no geometric justification.

Final Answer: $\angle APB = 40^\circ \Rightarrow \boxed{A}$

Answer: (A) [Go Back to Q 9](#)

Q10.

Solution

Concept — Heron's Formula: For sides a, b, c and semi-perimeter $s = (a+b+c)/2$:

$$\text{Area} = \sqrt{s(s-a)(s-b)(s-c)}.$$

Step 1 — Semi-perimeter.

$$s = \frac{13 + 14 + 15}{2} = 21 \text{ cm.}$$

Step 2 — Area.

$$\text{Area} = \sqrt{21 \times 8 \times 7 \times 6} = \sqrt{7056} = 84 \text{ cm}^2.$$

Check: $21 \times 8 = 168$; $7 \times 6 = 42$; $168 \times 42 = 7056$; $\sqrt{7056} = 84 \checkmark$.

Why other options are wrong:

- Option A: 72 — incorrect factor arithmetic.
- Option C: 96 — error in computing $(s-a)$ or $(s-b)$.
- Option D: 100 requires the product under the root to be 10000; here it is 7056.

Final Answer: $\text{Area} = 84 \text{ cm}^2 \Rightarrow \boxed{B}$

Answer: (B) [Go Back to Q 10](#)



Q11.

Solution**Concept — Surface Area of a Sphere:** $SA = 4\pi r^2$.**Step 1 — Substitute** $r = 7$ **cm and** $\pi = \frac{22}{7}$.

$$SA = 4 \times \frac{22}{7} \times 7^2 = 4 \times \frac{22}{7} \times 49 = 4 \times 22 \times 7 = 616 \text{ cm}^2.$$

Why other options are wrong:

- Option A: $462 = 3\pi r^2$ — uses the coefficient 3 instead of 4.
- Option B: 528 arises from an arithmetic slip in the final multiplication.
- Option D: $704 = 4 \times \frac{22}{7} \times 64$ — uses $r = 8$ cm instead of 7 cm.

Final Answer: $SA = 616 \text{ cm}^2 \Rightarrow \boxed{\text{C}}$ **Answer: (C)** [Go Back to Q 11](#)

Q12.

Solution**Concept — Mean:** Sum of n observations $= n \times \bar{x}$.**Step 1 — Original sum.**

$$\text{Sum} = 5 \times 12 = 60.$$

Step 2 — New sum after replacing 10 with 18.

$$\text{New sum} = 60 - 10 + 18 = 68.$$

Step 3 — New mean.

$$\bar{x}_{\text{new}} = \frac{68}{5} = 13.6.$$

Why other options are wrong:

- Option A: 12.6 uses a net gain of +3 instead of +8.
- Option B: 13.0 uses a net gain of +5 instead of +8.
- Option C: 13.2 uses a net gain of +6 instead of +8.

Final Answer: New mean $= 13.6 \Rightarrow \boxed{\text{D}}$ **Answer: (D)** [Go Back to Q 12](#)

Q13.

Solution**Concept — Complementary Probability:** $P(\text{not green}) = 1 - P(\text{green})$.**Step 1 — Total marbles.** $4 + 3 + 5 = 12$.**Step 2 — Compute the complement.**

$$P(\text{green}) = \frac{5}{12}, \quad P(\text{not green}) = 1 - \frac{5}{12} = \frac{7}{12}.$$

Why other options are wrong:

- Option B: $\frac{5}{12}$ is $P(\text{green})$, not its complement.
- Option C: $\frac{1}{3} = \frac{4}{12}$ counts only the red marbles.
- Option D: $\frac{2}{3} = \frac{8}{12} \neq \frac{7}{12}$.

Final Answer: $P(\text{not green}) = \frac{7}{12} \Rightarrow \boxed{\text{A}}$ **Answer: (A)** [Go Back to Q 13](#)

Q14.

Solution**Concept — Mid-Point Formula:**

$$M = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right).$$

Step 1 — Substitute $A(3, -5)$ **and** $B(7, 9)$.

$$M = \left(\frac{3+7}{2}, \frac{-5+9}{2} \right) = (5, 2).$$

Why other options are wrong:

- Option A: $(5, 4)$ — found $y = -5 + 9 = 4$ but forgot to divide by 2; correct $y = 4/2 = 2$.
- Option C: $(4, 2)$ — used $x = (3 + 5)/2 = 4$ (wrong second x -coordinate).
- Option D: $(4, 7)$ — carries errors in both coordinates.

Final Answer: Mid-point = $(5, 2) \Rightarrow \boxed{\text{B}}$ **Answer: (B)** [Go Back to Q 14](#)

Q15.

Solution

Concept — Vieta's Formulas: For $p(x) = ax^2 + bx + c$, product of zeroes = $\frac{c}{a}$.

Step 1 — Identify coefficients. $a = 2, b = -5, c = 3$.

Step 2 — Product of zeroes.

$$\alpha\beta = \frac{c}{a} = \frac{3}{2}.$$

Step 3 — Verify. $2x^2 - 5x + 3 = (2x - 3)(x - 1)$, so zeroes are $\frac{3}{2}$ and 1. Product = $\frac{3}{2} \times 1 = \frac{3}{2} \checkmark$.

Why other options are wrong:

- Option A: $\frac{5}{2} = \frac{-b}{a}$ is the *sum* of the zeroes.
- Option B: $-\frac{5}{2}$ carries a wrong sign for the sum.
- Option D: $-\frac{3}{2}$ carries an incorrect sign for the product ($c/a > 0$ here).

Final Answer: Product of zeroes = $\frac{3}{2} \Rightarrow \boxed{\text{C}}$

Answer: (C) [Go Back to Q 15](#)



Answer Key

Q	Ans	Q	Ans	Q	Ans	Q	Ans	Q	Ans
1	A	2	B	3	C	4	D	5	A
6	B	7	C	8	D	9	A	10	B
11	C	12	D	13	A	14	B	15	C

