

TALLENTEX Mathematics

Sample Paper – 1

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. What is the sum of the rational numbers $\frac{5}{12}$ and $\frac{7}{18}$?

- (A) $\frac{29}{36}$
- (B) $\frac{12}{30}$
- (C) $\frac{2}{5}$
- (D) $\frac{7}{12}$

Q2. By prime factorisation, the square root of 5929 is:

- (A) 71
- (B) 77
- (C) 83
- (D) 91

Q3. The present age of a father is three times the present age of his son. Five years ago, the father's age was four times the son's age at that time. What is the present age of the son?

- (A) 10 years
- (B) 12 years



(C) 15 years

(D) 18 years

Q4. A shopkeeper buys an article for Rs. 840 and wishes to make a profit of 25%. What should be the selling price of the article?

(A) Rs. 960

(B) Rs. 1000

(C) Rs. 1020

(D) Rs. 1050

Q5. Using the factor theorem, determine whether $(x - 2)$ is a factor of $p(x) = x^3 - 3x^2 + 4x - 4$.

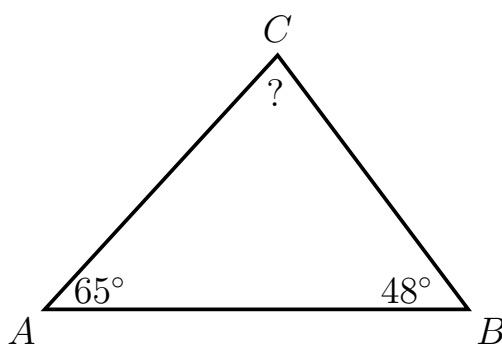
(A) Yes, because $p(2) = 0$

(B) No, because $p(2) = 4$

(C) Yes, because $p(-2) = 0$

(D) No, because $p(2) = -4$

Q6. In the triangle ABC shown below, $\angle A = 65^\circ$ and $\angle B = 48^\circ$. Find $\angle C$.



(A) 57°

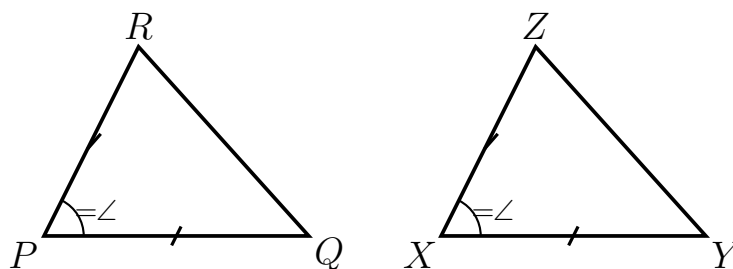
(B) 67°

(C) 77°

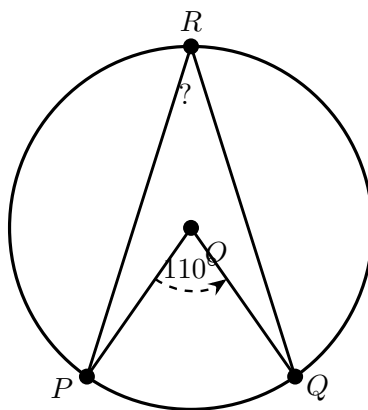
(D) 87°



- Q7.** Two triangles are shown below. Which congruence criterion proves $\triangle PQR \cong \triangle XYZ$?



- (A) SSS (Side-Side-Side)
(B) ASA (Angle-Side-Angle)
(C) SAS (Side-Angle-Side)
(D) RHS (Right Angle-Hypotenuse-Side)
- Q8.** In a parallelogram $ABCD$, $\angle A = 112^\circ$. What is the measure of $\angle C$?
- (A) 58°
(B) 68°
(C) 78°
(D) 112°
- Q9.** In the figure below, O is the centre of the circle. The central angle $\angle POQ = 110^\circ$. Find the inscribed angle $\angle PRQ$, where R is a point on the major arc PQ .



- (A) 55°



- (B) 110°
- (C) 70°
- (D) 45°

Q10. Find the area of a triangle whose sides are 13 cm, 14 cm, and 15 cm (use Heron's formula; $s = 21$ cm).

- (A) 72 cm^2
- (B) 84 cm^2
- (C) 96 cm^2
- (D) 108 cm^2

Q11. Find the volume of a right circular cylinder with radius $r = 7$ cm and height $h = 10$ cm. (Use $\pi = \frac{22}{7}$.)

- (A) 1340 cm^3
- (B) 1440 cm^3
- (C) 1540 cm^3
- (D) 1640 cm^3

Q12. Find the mean of the following data set: 12, 18, 25, 30, 8, 22, 15.

- (A) 17
- (B) 18
- (C) 19
- (D) $\frac{130}{7}$

Q13. A fair six-faced die is rolled once. What is the probability of getting a prime number?

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



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

Q14. Find the distance between the points $A(3, -4)$ and $B(-5, 2)$ using the distance formula.

- (A) 8
(B) 10
(C) 12
(D) $6\sqrt{3}$

Q15. Expand $(3x + 2y)^2$ using the identity $(a + b)^2 = a^2 + 2ab + b^2$.

- (A) $9x^2 + 6xy + 4y^2$
(B) $9x^2 + 4y^2$
(C) $9x^2 + 12xy + 4y^2$
(D) $6x^2 + 12xy + 4y^2$



Detailed Solutions

Q1.

Solution

Concept — Rational Numbers: To add fractions with different denominators, first find the LCM of the denominators.

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

Step 2 — Convert each fraction to the common denominator.

$$\frac{5}{12} = \frac{5 \times 3}{36} = \frac{15}{36}, \quad \frac{7}{18} = \frac{7 \times 2}{36} = \frac{14}{36}.$$

Step 3 — Add.

$$\frac{15}{36} + \frac{14}{36} = \frac{29}{36}.$$

The fraction $\frac{29}{36}$ is already in its lowest terms (29 is prime).

Why other options are wrong:

- Option B: $\frac{12}{30} = \frac{2}{5}$ is the result of incorrectly adding numerators and denominators directly.
- Option C: $\frac{2}{5}$ is simply wrong numerically.
- Option D: $\frac{7}{12}$ uses only part of the calculation.

Final Answer: $\frac{5}{12} + \frac{7}{18} = \frac{29}{36} \Rightarrow \boxed{\text{A}}$

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

Q2.

Solution

Concept — Squares and Square Roots: Express the number as a product of prime factors; each prime appears in pairs for a perfect square.

Step 1 — Factorise 5929.

$$5929 \div 7 = 847, \quad 847 \div 7 = 121, \quad 121 \div 11 = 11, \quad 11 \div 11 = 1.$$

So $5929 = 7^2 \times 11^2$.



Step 2 — Take the square root.

$$\sqrt{5929} = \sqrt{7^2 \times 11^2} = 7 \times 11 = 77.$$

Why other options are wrong:

- Option A: $71^2 = 5041 \neq 5929$.
- Option C: $83^2 = 6889 \neq 5929$.
- Option D: $91^2 = 8281 \neq 5929$.

Final Answer: $\sqrt{5929} = 77 \Rightarrow$ B

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

Q3.

Solution

Concept — Linear Equations in One Variable: Translate the word problem into an equation and solve.

Step 1 — Set up variables. Let the son's present age = x years. Then the father's present age = $3x$ years.

Step 2 — Use the condition for 5 years ago. Five years ago: son's age = $x - 5$, father's age = $3x - 5$.

$$3x - 5 = 4(x - 5) \implies 3x - 5 = 4x - 20 \implies 20 - 5 = 4x - 3x \implies x = 15.$$

Step 3 — Verify. Son now = 15, father now = 45. Five years ago: son = 10, father = 40; $40 = 4 \times 10$. ✓

Why other options are wrong:

- Option A: $x = 10$ gives father = 30; 5 years ago son = 5, father = 25; $25 \neq 4 \times 5 = 20$.
- Option B: $x = 12$ gives father = 36; 5 years ago son = 7, father = 31; $31 \neq 28$.
- Option D: $x = 18$ gives father = 54; 5 years ago son = 13, father = 49; $49 \neq 52$.

Final Answer: Son's present age = 15 years $\Rightarrow$ C

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



Q4.

Solution

Concept — Profit and Loss: Selling Price = Cost Price $\times \left(1 + \frac{\text{Profit}\%}{100}\right)$.

Step 1 — Apply the formula.

$$\text{SP} = 840 \times \left(1 + \frac{25}{100}\right) = 840 \times \frac{125}{100} = 840 \times 1.25 = 1050.$$

Why other options are wrong:

- Option A: Rs. 960 corresponds to a $\approx 14.3\%$ profit, not 25%.
- Option B: Rs. 1000 corresponds to a profit of Rs. 160, i.e., $\approx 19\%$.
- Option C: Rs. 1020 corresponds to a profit of Rs. 180, i.e., $\approx 21.4\%$.

Final Answer: Selling price = Rs. 1050 $\Rightarrow$ D

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

Q5.

Solution

Concept — Factor Theorem: $(x - a)$ is a factor of $p(x)$ if and only if $p(a) = 0$.

Step 1 — Substitute $x = 2$ into $p(x) = x^3 - 3x^2 + 4x - 4$.

$$p(2) = 2^3 - 3(2)^2 + 4(2) - 4 = 8 - 12 + 8 - 4 = 0.$$

Step 2 — Conclude. Since $p(2) = 0$, the factor theorem confirms that $(x - 2)$ is a factor of $p(x)$.

Why other options are wrong:

- Option B: Incorrectly claims $p(2) = 4$.
- Option C: Tests $p(-2)$, which is irrelevant for the factor $(x - 2)$; $p(-2) = -32 \neq 0$.
- Option D: Incorrectly claims $p(2) = -4$.

Final Answer: Yes, $(x - 2)$ is a factor because $p(2) = 0 \Rightarrow$ A

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



Q6.

Solution

Concept — Angle Sum Property of a Triangle: The sum of all three interior angles of a triangle is 180° .

Step 1 — Apply the property.

$$\angle A + \angle B + \angle C = 180^\circ \implies 65^\circ + 48^\circ + \angle C = 180^\circ \implies \angle C = 180^\circ - 113^\circ = 67^\circ.$$

Why other options are wrong:

- Option A: 57° would make the sum $170^\circ \neq 180^\circ$.
- Option C: 77° would make the sum $190^\circ \neq 180^\circ$.
- Option D: 87° would make the sum $200^\circ \neq 180^\circ$.

Final Answer: $\angle C = 67^\circ \Rightarrow \boxed{\text{B}}$

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

Q7.

Solution

Concept — Triangle Congruence: Two triangles are congruent by **SAS** (Side-Angle-Side) if two sides and the *included* angle of one triangle are equal to the corresponding two sides and the included angle of the other triangle.

Step 1 — Identify the given information from the figure. In $\triangle PQR$ and $\triangle XYZ$:

- $PQ = XY$ (one pair of equal sides, marked with single ticks on PQ and XY).
- $PR = XZ$ (second pair of equal sides, marked with single ticks on PR and XZ).
- $\angle P = \angle X$ (the angle *included* between those two sides, marked equal).

Step 2 — Apply SAS. Two sides and their *included* angle are equal $\Rightarrow \triangle PQR \cong \triangle XYZ$ by **SAS**.

Why other options are wrong:

- Option A (SSS): Only two sides are marked equal, not all three.
- Option B (ASA): ASA requires two angles and the included side; angles at Q and R are not given.



- Option D (RHS): RHS applies only to right-angled triangles; no right angle is indicated.

Final Answer: SAS (Side-Angle-Side) $\Rightarrow$

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

Q8.

Solution

Concept — Properties of a Parallelogram: In a parallelogram, opposite angles are equal, i.e., $\angle A = \angle C$ and $\angle B = \angle D$.

Step 1 — Identify opposite angles. In parallelogram $ABCD$, vertices A and C are opposite.

$$\angle C = \angle A = 112^\circ.$$

Step 2 — Verify. Adjacent angles in a parallelogram are supplementary: $\angle A + \angle B = 180^\circ \Rightarrow \angle B = 68^\circ$. Then $\angle D = \angle B = 68^\circ$. Sum: $112 + 68 + 112 + 68 = 360^\circ$.
✓

Why other options are wrong:

- Option A: 58° is incorrect; adjacent (not opposite) angles would need to sum to 180° with $\angle A$, giving 68° , not 58° .
- Option B: 68° is the measure of adjacent angle $\angle B$ (or $\angle D$), not $\angle C$.
- Option C: 78° has no basis in this problem.

Final Answer: $\angle C = 112^\circ \Rightarrow$

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

Q9.

Solution

Concept — Inscribed Angle Theorem: The angle subtended by an arc at the centre of a circle is **twice** the angle subtended by the same arc at any point on the remaining part of the circle.

Step 1 — Identify the arcs. Central angle $\angle POQ = 110^\circ$ subtends the minor arc PQ . The inscribed angle $\angle PRQ$ (with R on the *major* arc) also subtends the same minor arc PQ .



Step 2 — Apply the theorem.

$$\angle POQ = 2 \times \angle PRQ \implies \angle PRQ = \frac{110^\circ}{2} = 55^\circ.$$

Why other options are wrong:

- Option B: 110° is the central angle itself, not the inscribed angle.
- Option C: 70° would arise only if the central angle were 140° .
- Option D: 45° has no basis in this configuration.

Final Answer: $\angle PRQ = 55^\circ \Rightarrow$ A

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

Q10.

Solution

Concept — Heron's Formula: For a triangle with sides a, b, c and semi-perimeter $s = \frac{a+b+c}{2}$:

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

Step 1 — Identify the values. $a = 13, b = 14, c = 15, s = \frac{13+14+15}{2} = 21$.

Step 2 — Compute.

$$\text{Area} = \sqrt{21 \times (21-13) \times (21-14) \times (21-15)} = \sqrt{21 \times 8 \times 7 \times 6} = \sqrt{7056} = 84 \text{ cm}^2.$$

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

Why other options are wrong:

- Option A: 72 cm^2 is incorrect; $72^2 = 5184 \neq 7056$.
- Option C: 96 cm^2 is incorrect; $96^2 = 9216 \neq 7056$.
- Option D: 108 cm^2 is incorrect; $108^2 = 11664 \neq 7056$.

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

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



Q11.

Solution**Concept — Volume of a Cylinder:** $V = \pi r^2 h$.**Step 1 — Substitute the values.**

$$V = \frac{22}{7} \times 7^2 \times 10 = \frac{22}{7} \times 49 \times 10 = 22 \times 7 \times 10 = 1540 \text{ cm}^3.$$

Why other options are wrong:

- Option A: 1340 cm^3 – arithmetic error.
- Option B: 1440 cm^3 – arithmetic error.
- Option D: 1640 cm^3 – arithmetic error.

Final Answer: $V = 1540 \text{ cm}^3 \Rightarrow \boxed{\text{C}}$ **Answer: (C)** [Go Back to Q 11](#)

Q12.

Solution**Concept — Mean:** $\bar{x} = \frac{\text{Sum of all observations}}{\text{Number of observations}}$.**Step 1 — Add all values.**

$$12 + 18 + 25 + 30 + 8 + 22 + 15 = 130.$$

Step 2 — Divide by the number of observations (7).

$$\bar{x} = \frac{130}{7} \approx 18.57.$$

The exact value is $\frac{130}{7}$, which is not a whole number.**Why other options are wrong:**

- Option A: 17 would require the sum to be $119 \neq 130$.
- Option B: 18 would require the sum to be $126 \neq 130$.
- Option C: 19 would require the sum to be $133 \neq 130$.

Final Answer: Mean = $\frac{130}{7} \Rightarrow \boxed{\text{D}}$ **Answer: (D)** [Go Back to Q 12](#)

Q13.

Solution

Concept — Probability: $P(\text{event}) = \frac{\text{Number of favourable outcomes}}{\text{Total number of outcomes}}$.

Step 1 — List all outcomes and prime numbers. Outcomes when a die is rolled: $\{1, 2, 3, 4, 5, 6\}$. Total = 6.

Prime numbers in this set: $\{2, 3, 5\}$. Favourable outcomes = 3.

Step 2 — Calculate probability.

$$P(\text{prime}) = \frac{3}{6} = \frac{1}{2}.$$

Why other options are wrong:

- Option B: $\frac{1}{3}$ corresponds to 2 favourable outcomes, not 3.
- Option C: $\frac{2}{3}$ corresponds to 4 favourable outcomes, not 3.
- Option D: $\frac{1}{6}$ corresponds to only 1 favourable outcome.

Final Answer: $P(\text{prime}) = \frac{1}{2} \Rightarrow \boxed{\text{A}}$

Answer: (A) [Go Back to Q 13](#)

Q14.

Solution

Concept — Distance Formula: The distance between points (x_1, y_1) and (x_2, y_2) is

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}.$$

Step 1 — Identify coordinates. $A(3, -4)$ and $B(-5, 2)$.

Step 2 — Substitute.

$$d = \sqrt{(-5 - 3)^2 + (2 - (-4))^2} = \sqrt{(-8)^2 + (6)^2} = \sqrt{64 + 36} = \sqrt{100} = 10.$$

Why other options are wrong:

- Option A: 8 ignores the vertical component.
- Option C: 12 is incorrect; $12^2 = 144 \neq 100$.



- Option D: $6\sqrt{3} \approx 10.39 \neq 10$.

Final Answer: Distance $AB = 10 \Rightarrow$ B

Answer: (B) [Go Back to Q 14](#)

Q15.

Solution

Concept — Algebraic Identity: $(a + b)^2 = a^2 + 2ab + b^2$.

Step 1 — Identify a and b . Here $a = 3x$ and $b = 2y$.

Step 2 — Expand.

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

Why other options are wrong:

- Option A: $9x^2 + 6xy + 4y^2$ uses $2ab = 2(3x)(2y) = 12xy$, not $6xy$; middle term is wrong.
- Option B: $9x^2 + 4y^2$ omits the middle term $12xy$ entirely.
- Option D: $6x^2 + 12xy + 4y^2$ computes $(3x)^2$ incorrectly as $6x^2$.

Final Answer: $(3x + 2y)^2 = 9x^2 + 12xy + 4y^2 \Rightarrow$ 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

