# CBSE 2025 Maths Standard — Set 2

English Medium

Time Allowed: 3 Hours | Maximum Marks: 80

General Instructions:

1. This question paper contains 38 questions. All questions are compulsory.
2. Section A has 20 MCQs carrying 1 mark each.
3. Section B has 6 questions carrying 2 marks each.
4. Section C has 6 questions carrying 3 marks each.
5. Section D has 4 questions carrying 5 marks each.
6. Section E has 3 case-study based questions carrying 4 marks each.
7. Draw neat figures wherever required.

# Section A

## Multiple Choice Questions (1 mark each)

Q.1 [1 mark]

If $7\cos^2\theta + 3\sin^2\theta = 4$, then the value of $\theta$ is:

(a) 30°

(b) 45°

(c) 60°

(d) 90°

Q.2 [1 mark]

The probability of drawing an even prime number out of numbers from 1 to 30 is:

(a) 1/30

(b) 4/15

(c) 7/30

(d) 0

Q.3 [1 mark]

The quadratic equation whose roots are 7 and 1/7 is:

(a) $7x^2 - 50x + 7 = 0$

(b) $7x^2 - 50x + 1 = 0$

(c) $7x^2 + 50x - 7 = 0$

(d) $7x^2 + 50x - 1 = 0$

Q.4 [1 mark]

The least number which is a perfect square and is divisible by each of 16, 20 and 50, is:

(a) 1200

(b) 100

(c) 3600

(d) 2400

Q.5 [1 mark]

The coordinates of the end points of a diameter of a circle are (5, −2) and (5, 2). The length of the radius of the circle is:

(a) ± 2
(b) ± 4
(c) 4
(d) 2

Q.6 [1 mark]

The points (−5, 0), (5, 0) and (0, 4) are the vertices of a triangle which is a/an:

(a) right-angled triangle
(b) isosceles triangle
(c) equilateral triangle
(d) scalene triangle

Q.7 [1 mark]

In the given figure, RS is the tangent to the circle at the point L and MN is the diameter. If ∠NML = 30°, then ∠RLM is:

(a) 30°
(b) 60°
(c) 90°
(d) 120°

Q.8 [1 mark]

In the given figure, PQ ∥ BC. If AP/PB = 4/13 and AC = 20.4 cm, then the length of AQ is:

(a) 2.8 cm
(b) 5.8 cm

(c) 3.8 cm

(d) 4.8 cm

Q.9 [1 mark]

Which of the following statements is incorrect?

(a) Two congruent figures are always similar.

(b) A square and a rhombus of the same area are always similar.

(c) Two equilateral triangles are always similar.

(d) Two similar triangles need not be congruent.

Q.10 [1 mark]

The sum of the exponents of prime factors in the prime factorisation of 4004 is:

(a) 5

(b) 4

(c) 3

(d) 2

Q.11 [1 mark]

In a cricket match, a batsman hits the boundary 7 times out of the 42 balls he plays. The probability of his not hitting a boundary is:

(a) 1/7

(b) 2/7

(c) 5/6

(d) 1/6

Q.12 [1 mark]

If a large circular pizza is divided into 5 equal sectors, then the central angle of each sector will be:

(a) 60°

(b) 90°

(c) 45°

(d) 72°

Q.13 [1 mark]

If sin 30° tan 45° = sec 60°/k, then the value of k is:

(a) 4

(b) 3

(c) 2

(d) 1

Q.14 [1 mark]

The line represented by the equation x − y = 0 is:

(a) parallel to x-axis

(b) parallel to y-axis

(c) passing through the origin

(d) passing through the point (3, 2)

Q.15 [1 mark]

The 10th term of the AP 5, 19/4, 9/2, 17/4, ... is:

(a) 11/4

(b) 4/11

(c) 13/4

(d) 4/13

Q.16 [1 mark]

If −4 is a zero of the polynomial $p(x) = x^2 - x - (2 + 2k)$, then the value of k is:

(a) 3

(b) 9

(c) 6

(d) −9

Q.17 [1 mark]

The equation of a line parallel to the x-axis and at a distance of 3 units below x-axis is:

(a) $x = 3$
(b) $x = -3$
(c) $y = -3$
(d) $y = 3$

Q.18 [1 mark]

The HCF of 40, 110 and 360 is:

(a) 40
(b) 110
(c) 360
(d) 10

Q.19 [1 mark]

Assertion (A): Common difference of the AP: 5, 1, −3, −7, ... is 4.
Reason (R): Common difference of the AP: $a_1$, $a_2$, $a_3$, ..., a is obtained by $d = a - a_{-1}$.

Select the correct option:

(a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A).
(b) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of the Assertion (A).
(c) Assertion (A) is true, but Reason (R) is false.
(d) Assertion (A) is false, but Reason (R) is true.

Q.20 [1 mark]

Assertion (A): The pair of linear equations $px + 3y + 59 = 0$ and $2x + 6y + 118 = 0$ will have infinitely many solutions if $p = 1$.

Reason (R): If the pair of linear equations $px + 3y + 19 = 0$ and $2x + 6y + 157 = 0$ has a unique solution, then $p \neq 1$.

Select the correct option:

(a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A).
(b) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of the Assertion (A).
(c) Assertion (A) is true, but Reason (R) is false.
(d) Assertion (A) is false, but Reason (R) is true.

## Section B

Very Short Answer Questions (2 marks each)

Q.21 [2 marks]

If p and q are zeroes of the polynomial $p(y) = 21y^2 - y - 2$, then find the value of $(1 - p) \cdot (1 - q)$.

Q.22 [2 marks]

(a) In the given figure, the shape of the top of a table is that of a sector of a circle with centre O and $\angle AOB = 90°$. If AO = OB = 42 cm, then find the perimeter of the top of the table.

OR

Q.22 [2 marks]

(b) In the given figure, three sectors of a circle of radius 5 cm, making angles 35°, 50° and 95° at the centre are shaded. Find the area of the shaded region. [Use $\pi = 22/7$]

Q.23 [2 marks]

If $\tan A = \sqrt{3}$, where A is an acute angle, then find the value of $\sin^2 A / (1 +$

$\cos^2 A$).

Q.24 [2 marks]

(a) In the given figure, D is a point on the side BC of $\Delta ABC$ such that $\angle ADC = \angle BAC$. Show that $CA^2 = CD \cdot CB$.

OR

Q.24 [2 marks]

(b) In the given figure, $OA \cdot OB = OC \cdot OD$. Show that $\angle A = \angle C$ and $\angle B = \angle D$.

Q.25 [2 marks]

At point A on the diameter AB of a circle of radius 10 cm, tangent XAY is drawn to the circle. Find the length of the chord CD parallel to XY at a distance of 16 cm from A.

Q.26 [2 marks]

(a) Prove that the parallelogram circumscribing a circle is a rhombus.

OR

Q.26 [2 marks]

(b) Prove that the angle between the two tangents drawn from an external point to a circle is supplementary to the angle subtended by the line-segment joining the points of contact at the centre.

## Section C

### Short Answer Questions (3 marks each)

Q.27 [3 marks]

(a) Prove that: $(1 + 1/\tan^2\theta)(1 + 1/\cot^2\theta) = 1/(\sin^2\theta - \sin^4\theta)$.

OR

Q.27 [3 marks]

(b) Prove that: $\sqrt{[(\text{cosec}\,\theta - 1)/(\text{cosec}\,\theta + 1)]} + \sqrt{[(\text{cosec}\,\theta + 1)/(\text{cosec}\,\theta - 1)]} = 2\sec\theta$.

Q.28 [3 marks]

If the mid-point of the line segment joining the points A(3, 4) and B(k, 6) is P(x, y) and $x + y - 10 = 0$, then find the value of k.

Q.29 [3 marks]

The length of the hour hand of a clock is 10 cm. Find the area of the minor sector swept by the hour hand of the clock between 5 a.m. to 8 a.m. Also, find the area of the major sector.

Q.30 [3 marks]

Prove that $\sqrt{3}$ is an irrational number.

Q.31 [3 marks]

A sum of Rs.2,000 is invested at 7% per annum simple interest. Calculate the interests at the end of 1st, 2nd and 3rd year. Do these interests form an AP? If so, find the interest at the end of the 27th year.

Q.32 [3 marks]

(a) Two ships are sailing in the sea on either side of a lighthouse. The angles of depression to the two ships as observed from the top of the lighthouse are 60° and 45°, respectively. If the distance between the ships is $100[(1 + \sqrt{3})/\sqrt{3}]$ m, then find the height of the lighthouse.

OR

Q.32 [3 marks]

(b) The angles of depression of the top and the bottom of an 8 m tall building from the top of another multistoried building are 30° and 45°, respectively. Find the height of the multistoried building and the distance between the two

buildings.

## Section D

Long Answer Questions (5 marks each)

Q.33 [5 marks]

(a) The sum of the areas of two squares is 52 cm² and the difference of their perimeters is 8 cm. Find the lengths of the sides of the two squares.

OR

Q.33 [5 marks]

(b) The time taken by a person to travel an upward distance of 150 km was 2½ hours more than the time taken in the downward return journey. If he returned at a speed of 10 km/h more than the speed while going up, find the speeds in each direction.

Q.34 [5 marks]

Prove that a line drawn parallel to one side of a triangle to intersect the other two sides in distinct points divides the other two sides in the same ratio. Hence, in the figure given below, prove that AM/MB = AN/ND where LM ‖ CB and LN ‖ CD.

Q.35 [5 marks]

Find the Mean and Mode of the following frequency distribution:

Class: 0–10, 10–20, 20–30, 30–40, 40–50, 50–60, 60–70
Frequency: 8, 7, 15, 20, 12, 8, 10

Q.36(a) [5 marks]

Case Study 1: A school is organizing a grand cultural event to show the talent of its students. To accommodate the guests, the school plans to rent

chairs and tables from a local supplier. It finds that rent for each chair is Rs.50 and for each table is Rs.200. The school spends Rs.30,000 for renting the chairs and tables. Also, the total number of items (chairs and tables) rented are 300.

(i) If the school rents 'x' chairs and 'y' tables, write down the pair of linear equations representing the given information.

Q.36(b) [5 marks]

Case Study 1 (contd.): A school rents 'x' chairs at Rs.50 each and 'y' tables at Rs.200 each. Total items = 300, total cost = Rs.30,000.

(ii)(a) Find the number of chairs and number of tables rented by the school.

OR

Q.36(b) [5 marks]

Case Study 1 (contd.): A school rents 'x' chairs at Rs.50 each and 'y' tables at Rs.200 each. Total items = 300.

(ii)(b) If the school wants to spend a maximum of Rs.27,000 on 300 items (tables and chairs), then find the number of chairs and tables it can rent.

Q.36(c) [5 marks]

Case Study 1 (contd.): A school rents chairs at Rs.50 each and tables at Rs.200 each. Total budget = Rs.30,000.

(iii) What is the maximum number of tables that can be rented in Rs.30,000 if no chairs are rented?

Q.37(a) [4 marks]

Case Study 2: Rahul is a lucky charm for his cricket team. He has a jar of

cards with numbers from 10 to 74. Before each match, he draws a card from the jar. If the card bears an even number, the team wins. If the number is even and divisible by 5, they win by a big margin. If the number is an odd number less than 30, they win by a small margin. And if the number is a prime number between 50 and 74, they lose.

(i) What is the probability that Rahul draws a card with an even number?

Q.37(b) [4 marks]

Case Study 2 (contd.): Rahul has cards numbered 10 to 74.

(ii) What is the probability that Rahul draws a card with an odd number less than 30?

Q.37(c) [4 marks]

Case Study 2 (contd.): Rahul has cards numbered 10 to 74.

(iii)(a) What is the probability that Rahul draws a card with a prime number between 50 and 74?

OR

Q.37(c) [4 marks]

Case Study 2 (contd.): Rahul has cards numbered 10 to 74.

(iii)(b) What is the probability that Rahul draws a card with an even number divisible by 5?

Q.38(a) [4 marks]

Case Study 3: A skilled carpenter decided to craft a special rolling pin for the local baker. He carefully joined three cylindrical pieces of wood — two small ones on the ends and one larger in the centre to create a perfect tool. The

length of the bigger cylindrical part is 12 cm and diameter is 7 cm. The length of each smaller cylindrical part is 5 cm and diameter is 2.1 cm.

(i) Find the volume of the bigger cylindrical part.

Q.38(b) [4 marks]

Case Study 3 (contd.): Rolling pin with bigger cylinder (length 12 cm, diameter 7 cm) and two smaller cylinders (length 5 cm each, diameter 2.1 cm each).

(ii) Find the curved surface area of the bigger cylindrical part.

Q.38(c) [4 marks]

Case Study 3 (contd.): Rolling pin with bigger cylinder (length 12 cm, diameter 7 cm) and two identical smaller cylinders (length 5 cm each, diameter 2.1 cm each).

(iii)(a) Find the ratio of the volume of the bigger cylindrical part to the total volume of the two smaller (identical) cylindrical parts.

OR

Q.38(c) [4 marks]

Case Study 3 (contd.): Rolling pin with two identical smaller cylinders (length 5 cm each, diameter 2.1 cm each).

(iii)(b) Find the sum of the curved surface areas of the two identical smaller cylindrical parts.