CBSE 2025 Maths Standard — Set 1

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 α and β are the zeroes of the polynomial $3x^2 + 6x + k$ such that $\alpha + \beta + \alpha\beta = -2/3$, then the value of k is:

(a) −8

(b) 8

(c) −4

(d) 4

Q.2 [1 mark]

If x = 1 and y = 2 is a solution of the pair of linear equations $2x - 3y + a = 0$ and $2x + 3y - b = 0$, then:

(a) a = 2b

(b) 2a = b

(c) a + 2b = 0

(d) 2a + b = 0

Q.3 [1 mark]

The mid-point of the line segment joining the points P(−4, 5) and Q(4, 6) lies on:

(a) x-axis

(b) y-axis

(c) origin

(d) neither x-axis nor y-axis

Q.4 [1 mark]

If θ is an acute angle and $7 + 4 \sin \theta = 9$, then the value of θ is:

(a) 90°

(b) 30°

(c) 45°

(d) 60°

Q.5 [1 mark]

The value of $\tan^2\theta - (1/\cos\theta) \times \sec\theta$ is:

(a) 1

(b) 0

(c) −1

(d) 2

Q.6 [1 mark]

If HCF(98, 28) = m and LCM(98, 28) = n, then the value of n − 7m is:

(a) 0

(b) 28

(c) 98

(d) 198

Q.7 [1 mark]

The tangents drawn at the extremities of the diameter of a circle are always:

(a) parallel

(b) perpendicular

(c) equal

(d) intersecting

Q.8 [1 mark]

In triangles ABC and DEF, $\angle B = \angle E$, $\angle F = \angle C$ and AB = 3DE. Then, the two triangles are:

(a) congruent but not similar

(b) congruent as well as similar

(c) neither congruent nor similar

(d) similar but not congruent

Q.9 [1 mark]

If $(-1)^n + (-1)^8 = 0$, then n is:

(a) any positive integer
(b) any negative integer
(c) any odd number
(d) any even number

Q.10 [1 mark]

Two polynomials are shown in the graph below. The number of distinct zeroes of both the polynomials is:

(a) 3
(b) 5
(c) 2
(d) 4

Q.11 [1 mark]

If the sum of first m terms of an AP is $2m^2 + 3m$, then its second term is:

(a) 10
(b) 9
(c) 12
(d) 4

Q.12 [1 mark]

Mode and Mean of a data are 15x and 18x, respectively. Then the median of the data is:

(a) x
(b) 11x
(c) 17x
(d) 34x

Q.13 [1 mark]

A card is selected at random from a deck of 52 playing cards. The probability of it being a red face card is:

(a) 3/13
(b) 2/13
(c) 1/2
(d) 3/26

Q.14 [1 mark]

Which of the following is a rational number between $\sqrt{3}$ and $\sqrt{5}$?

(a) 1.4142387954012....
(b) 2.326
(c) π
(d) 1.857142

Q.15 [1 mark]

If a sector of a circle has an area of 40π sq. units and a central angle of 72°, the radius of the circle is:

(a) 200 units
(b) 100 units
(c) 20 units
(d) $10\sqrt{2}$ units

Q.16 [1 mark]

In the given figure, PA is a tangent from an external point P to a circle with centre O. If $\angle POB = 115°$, then $\angle APO$ is equal to:

(a) 25°
(b) 65°
(c) 90°
(d) 35°

Q.17 [1 mark]

A kite is flying at a height of 150 m from the ground. It is attached to a string inclined at an angle of 30° to the horizontal. The length of the string is:

(a) $100\sqrt{3}$ m
(b) 300 m
(c) $150\sqrt{2}$ m
(d) $150\sqrt{3}$ m

Q.18 [1 mark]

A piece of wire 20 cm long is bent into the form of an arc of a circle of radius $60/\pi$ cm. The angle subtended by the arc at the centre of the circle is:

(a) 30°
(b) 60°
(c) 90°
(d) 50°

Q.19 [1 mark]

Assertion (A): The probability of selecting a number at random from the numbers 1 to 20 is 1.

Reason (R): For any event E, if P(E) = 1, then E is called a sure event.

(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): If we join two hemispheres of same radius along their bases, then we get a sphere.

Reason (R): Total Surface Area of a sphere of radius r is $3\pi r^2$.

(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 $x \cos 60° + y \cos 0° + \sin 30° - \cot 45° = 5$, then find the value of $x + 2y$.

OR

Q.21 [2 marks]

Evaluate: $\tan^2 60° / (\sin^2 60° + \cos^2 30°)$.

Q.22 [2 marks]

Find the zeroes of the polynomial $p(x) = x^2 + (4/3)x - 4/3$.

Q.23 [2 marks]

The coordinates of the centre of a circle are $(2a, a - 7)$. If the circle passes through the point $(11, -9)$ and has diameter $10\sqrt{2}$ units, find the value(s) of 'a'.

Q.24 [2 marks]

If $\triangle ABC \sim \triangle PQR$ in which AB = 6 cm, BC = 4 cm, AC = 8 cm and PR = 6 cm, then find the length of (PQ + QR).

OR

Q.24 [2 marks]

In the given figure, $QR/QS = QT/PR$ and $\angle 1 = \angle 2$, show that $\triangle PQS \sim \triangle TQR$.

Q.25 [2 marks]

A person is standing at P outside a circular ground at a distance of 26 m from the centre of the ground. He found that his distances from the points A and B on the ground are 10 m (PA and PB are tangents to the circle). Find the radius of the circular ground.

Q.26 [2 marks]

In the given figure, O is the centre of the circle and BCD is tangent to it at C. Prove that ∠BAC + ∠ACD = 90°.

OR

Q.26 [2 marks]

Prove that opposite sides of a quadrilateral circumscribing a circle subtend supplementary angles at the centre of the circle.

Section C

Short Answer Questions (3 marks each)

Q.27 [3 marks]

Prove that: $\frac{\tan\theta}{1-\cot\theta} + \frac{\cot\theta}{1-\tan\theta} = 1 + \sec\theta\,\operatorname{cosec}\theta$.

OR

Q.27 [3 marks]

Prove that: $\frac{\sin A+\cos A}{\sin A-\cos A} + \frac{\sin A-\cos A}{\sin A+\cos A} = \frac{2}{2\sin^2 A - 1}$.

Q.28 [3 marks]

Find the ratio in which the y-axis divides the line segment joining the points (5, −6) and (−1, −4). Also find the point of intersection.

Q.29 [3 marks]

Prove that $1/\sqrt{5}$ is an irrational number.

Q.30 [3 marks]

A room is in the form of a cylinder surmounted by a hemispherical dome. The base radius of the hemisphere is half of the height of the cylindrical part. If the room contains 1408/21 m^3 of air, find the height of the cylindrical part. (Use $\pi = 22/7$).

Q.31 [3 marks]

Two dice are thrown at the same time. Determine the probability that the difference of the numbers on the two dice is 2.

Q.32 [3 marks]

Vijay invested certain amounts of money in two schemes A and B, which offer interest at the rate of 8% per annum and 9% per annum, respectively. He received Rs.1,860 as the total annual interest. However, had he interchanged the amounts of investments in the two schemes, he would have received Rs.20 more as annual interest. How much money did he invest in each scheme?

Section D

Long Answer Questions (5 marks each)

Q.33 [5 marks]

The diagonal BD of a parallelogram ABCD intersects the line segment AE at the point F, where E is any point on the side BC. Prove that $DF \times EF = FB \times FA$.

OR

Q.33 [5 marks]

In $\triangle ABC$, if $AD \perp BC$ and $AD^2 = BD \times DC$, then prove that $\angle BAC = 90°$.

Q.34 [5 marks]

The perimeter of a right triangle is 60 cm and its hypotenuse is 25 cm. Find the lengths of the other two sides of the triangle.

OR

Q.34 [5 marks]

A train travels a distance of 480 km at a uniform speed. If the speed had been 8 km/h less, then it would have taken 3 hours more to cover the same distance. Find the speed of the train.

Q.35 [5 marks]

Find the missing frequency 'f' in the following table, if the mean of the given data is 18. Hence find the mode of the data.

Daily Allowance | Number of Children
11–13 | 7
13–15 | 6
15–17 | 9
17–19 | 13
19–21 | f
21–23 | 5
23–25 | 4

Q.36(a) [5 marks]

A school is organizing a charity run to raise funds for a local hospital. The run is planned as a series of rounds around a track, with each round being 300 metres. To make the event more challenging and engaging, the organizers decide to increase the distance of each subsequent round by 50 metres. For example, the second round will be 350 metres, the third round will be 400 metres and so on. The total number of rounds planned is 10.

Write the fourth, fifth and sixth term of the Arithmetic Progression so formed.

Q.36(b) [5 marks]

Determine the distance of the 8th round.

Q.36(c) [5 marks]

Find the total distance run after completing all 10 rounds.

OR

Q.36(c) [5 marks]

If a runner completes only the first 6 rounds, what is the total distance run by the runner?

Q.37(a) [4 marks]

A brooch is a decorative piece often worn on clothing like jackets, blouses or dresses to add elegance. Made from precious metals and decorated with gemstones, brooches come in many shapes and designs.

One such brooch is made with silver wire in the form of a circle with diameter 35 mm. The wire is also used in making 5 diameters which divide the circle into 10 equal sectors as shown in the figure.

Find the central angle of each sector.

Q.37(b) [4 marks]

Find the length of the arc ACB.

Q.37(c) [4 marks]

Find the area of each sector of the brooch.

OR

Q.37(c) [4 marks]

Find the total length of the silver wire used.

Q.38(a) [4 marks]

Amrita stood near the base of a lighthouse, gazing up at its towering height. She measured the angle of elevation to the top and found it to be 60°. Then, she climbed a nearby observation deck, 40 metres higher than her original position and noticed the angle of elevation to the top of lighthouse to be 45°.

If CD is h metres, find the distance BD in terms of 'h'.

Q.38(b) [4 marks]

Find distance BC in terms of 'h'.

Q.38(c) [4 marks]

Find the height CE of the lighthouse. [Use $\sqrt{3} = 1.73$]

OR

Q.38(c) [4 marks]

If AC = 100 m, find distance AE.