Series MC-X-BSC

Roll No. | | | | | | | |

Candidates must write the Q.P. Code on the title page of the answer-book.

Q.P. Code
MC/X/B/10

MATHEMATICS (BASIC)

Class X • Sample Paper 10 • Session 2026–27

(As per the CBSE Sample Question Paper 2026–27 (Basic) design)

Time allowed : 3 hours **Maximum Marks : 80**

NOTE

(i) Please check that this question paper contains 5 printed pages.
(ii) Q.P. Code given on the right hand side of the question paper should be written on the title page of the answer-book by the candidate.
(iii) Please check that this question paper contains 38 questions.
(iv) Please write down the serial number of the question in the answer-book before attempting it.
(v) 15 minute time has been allotted to read this question paper. The students will read the question paper only and will not write any answer on the answer-book during this period.

General Instructions :

Read the following instructions carefully and follow them :

(i) This question paper contains **38** questions. All questions are compulsory.
(ii) This question paper is divided into **five** Sections – **A, B, C, D** and **E**.
(iii) In **Section A**, Questions no. **1** to **18** are multiple choice questions (MCQs) and questions no. **19** and **20** are Assertion-Reason based questions of **1** mark each.
(iv) In **Section B**, Questions no. **21** to **25** are very short answer (VSA) type questions, carrying **2** marks each.
(v) In **Section C**, Questions no. **26** to **31** are short answer (SA) type questions, carrying **3** marks each.
(vi) In **Section D**, Questions no. **32** to **35** are long answer (LA) type questions, carrying **5** marks each.
(vii) In **Section E**, Questions no. **36** to **38** are case study based questions carrying **4** marks each.
(viii) There is no overall choice. However, an internal choice has been provided in **2** questions in **Section B**, **2** questions in **Section C**, **2** questions in **Section D**, and in all the sub-parts of **2** marks in **Section E**.
(ix) Draw neat figures wherever required. Take $\pi = \frac{22}{7}$ wherever required, if not stated.
(x) Use of calculators is **NOT** allowed.

SECTION A

This section comprises 20 Multiple Choice Questions (MCQs) carrying 1 mark each.

1. If the HCF and the LCM of two numbers a and 18 are 2 and 36 respectively, then a is:

(A) 4 (B) 2 (C) 1 (D) 3

2. If one zero of the polynomial $x^2 - 4x + 1$ is $2 + \sqrt{3}$, then the other zero is:

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

3. The pair of linear equations $x = 0$ and $x = -4$ has:

(A) a unique solution (B) no solution

(C) infinitely many solutions (D) only the solution $(0, 0)$

4. The age of a son is one-third of his father's age. If the sum of their ages is 48 years, the son's age is:

(A) 12 years (B) 16 years (C) 36 years (D) 24 years

5. The roots of the quadratic equation $x^2 + 7x + 10 = 0$ are:

(A) $-2, -5$ (B) $2, 5$ (C) $-2, 5$ (D) $2, -5$

6. The first term of an A.P. is 4 and its 7^{th} term is 34. Its common difference is:

(A) 5 (B) 6 (C) 4 (D) 30

7. The sum of the first five multiples of 3 is:

(A) 45 (B) 55 (C) 65 (D) 75

8. If $(2, 2)$ is the mid-point of the line segment joining $(-1, 7)$ and $(x, -3)$, then x is:

(A) 5 (B) 3 (C) -5 (D) 1

9. A die is thrown once. The probability of getting a number which is a multiple of 2 or 3 is:

(A) $\frac{2}{3}$ (B) $\frac{1}{2}$ (C) $\frac{1}{3}$ (D) $\frac{5}{6}$

10. The class mark of the class 10–25 is:

(A) 17.5 (B) 15 (C) 12.5 (D) 35

11. The length of the tangent drawn from a point 15 cm away from the centre of a circle of radius 9 cm is:

(A) 12 cm (B) 6 cm (C) 24 cm (D) $\sqrt{306}$ cm

12. If the mode and the mean of a data are 7 and 4 respectively, then its median is:

(A) 5 (B) 6 (C) 4 (D) 5.5

13. The angle of elevation of the top of a 30 m high tower from a point on the ground at a distance of $30\sqrt{3}$ m from its foot is:

(A) 30° (B) 45° (C) 60° (D) 90°

14. The value of $\text{cosec}^2 60^\circ - 1$ is:

(A) $\frac{1}{3}$ (B) 3 (C) $\frac{2}{3}$ (D) $\frac{4}{3}$

15. If $\triangle ABC \sim \triangle PQR$, then which of the following is **not** true?

(A) $\frac{AB}{PQ} = \frac{BC}{QR}$ (B) $\angle A = \angle P$ (C) $\frac{AB}{QR} = \frac{AC}{PR}$ (D) $\angle C = \angle R$

16. A 1.5 m tall boy casts a shadow 2 m long. At the same time, a tree casts a shadow 12 m long. The height of the tree is:

(A) 9 m (B) 16 m (C) 8 m (D) 18 m

17. The angle between a tangent to a circle and the radius drawn at the point of contact is:

(A) 90° (B) 60° (C) 45° (D) 0°

18. The curved surface area of a hemisphere of radius 21 cm is:

(A) 2772 cm^2 (B) 1386 cm^2 (C) 4158 cm^2 (D) 5544 cm^2

*Questions number **19** and **20** are Assertion and Reason based questions. Two statements are given, one is labelled as Assertion (A) and the other is labelled as Reason (R). Select the correct answer to these questions from the codes (A), (B), (C) and (D) as given below.*

(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.

19. *Assertion (A) :* The probability of drawing a red card from a well-shuffled deck of 52 playing cards is $\frac{1}{2}$.

Reason (R) : A deck of playing cards has 4 suits of 13 cards each.

20. *Assertion (A) :* In $\triangle ABC$, $DE \parallel BC$ with D on AB and E on AC. If $\frac{AD}{DB} = \frac{3}{2}$ and $AE = 4.5$ cm, then $AC = 7.5$ cm.

Reason (R) : If a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, the other two sides are divided in the same ratio.

SECTION B

This section comprises 5 Very Short Answer (VSA) type questions carrying 2 marks each.

21. (a) Find the HCF and LCM of 85 and 238 by the prime factorisation method.

OR

(b) Find the smallest number which is exactly divisible by 8, 9, 12 and 15.

22. Evaluate: $2\sin^2 30^\circ \tan 60^\circ - 3\cos^2 60^\circ \sec^2 30^\circ$

23. If $\frac{1}{2}$ is a zero of the polynomial $2x^2 + 3x + k$, find the value of k and the other zero.

24. AB is a diameter and AC is a chord of a circle with centre O such that $\angle BAC = 30^\circ$. The tangent at C meets AB produced at D. Prove that $BC = BD$.

25. (a) Find the value of k if the point $P(0, 2)$ is equidistant from the points $(3, k)$ and $(k, 5)$.

OR

(b) Find the distance between the points (a, b) and $(-a, -b)$.

SECTION C

This section comprises 6 Short Answer (SA) type questions carrying 3 marks each.

26. Given that $\sqrt{5}$ is irrational, prove that $3\sqrt{5} - 2$ is an irrational number.

27. (a) The incircle of $\triangle ABC$ touches the sides BC, CA and AB at D, E and F respectively. If $BC = a$, $CA = b$, $AB = c$ and s is the semi-perimeter, prove that $BD = s - b$.

OR

(b) PQ is a tangent at Q to a circle with centre O, and QR is a diameter. If $OQ : PQ = 3 : 4$ and the perimeter of $\triangle POQ$ is 60 cm, find PQ, QR and OP.

28. The point $C(-1, 2)$ divides the line segment joining $A(2, 5)$ and $B(x, y)$ internally in the ratio $3 : 4$. Find the coordinates of B.

29. Prove that: $(\sin A + \cos A)(\tan A + \cot A) = \sec A + \operatorname{cosec} A$

30. (a) Find the mean of the following distribution:

Class	0–10	10–20	20–30	30–40	40–50
Frequency	12	16	6	7	9

OR

(b) Find the mode of the following distribution of family sizes:

Family size	1–3	3–5	5–7	7–9	9–11
No. of families	6	9	15	9	1

31. Five years hence, the age of Jacob will be three times that of his son. Five years ago, Jacob's age was seven times that of his son. Find their present ages.

SECTION D

This section comprises 4 Long Answer (LA) type questions carrying 5 marks each.

32. State and prove the Basic Proportionality Theorem. Using it, prove that the diagonals of a trapezium divide each other proportionally, i.e. if $ABCD$ is a trapezium with $AB \parallel DC$ whose diagonals intersect at O, then $\frac{AO}{OC} = \frac{BO}{OD}$.

33. (a) The sum of a number and its reciprocal is $\frac{10}{3}$. Find the number.

OR

(b) Is it possible to design a rectangular mango grove whose length is twice its breadth and whose area is 800 m^2? If so, find its length and breadth.

34. A pen stand made of wood is in the shape of a cuboid with four conical depressions to hold pens. The dimensions of the cuboid are 15 cm by 10 cm by 3.5 cm. The radius of each depression is 0.5 cm and the depth is 1.4 cm. Find the volume of wood in the entire stand.

35. (a) From a point P on the ground, the angles of elevation of the top of a 10 m tall building and of a helicopter hovering exactly over the top of the building are $30°$ and $60°$ respectively. Find the height of the helicopter above the ground.

OR

(b) The angle of elevation of the top of a vertical tower from a point on the ground is $60°$. From another point 10 m vertically above the first, its angle of elevation is $45°$. Find the height of the tower. (Use $\sqrt{3} = 1.732$)

SECTION E

This section comprises 3 case study based questions carrying 4 marks each.

36. A square lawn of side 20 m has a flower bed in the shape of a quadrant of a circle of radius 7 m at each of its four corners, with centres at the corners. Based on the above information, answer the following questions:

(i) Find the area of one flower bed. *1*

(ii) Find the total area of the four flower beds. *1*

(iii) (a) Find the area of the lawn left for grass. *2*

OR

(iii) (b) Find the total length of the curved edges of the four flower beds. *2*

37. In a potato race, a bucket is placed at the starting point, which is 5 m from the first potato, and the other potatoes are placed 3 m apart in a straight line. There are ten potatoes in the line. Each competitor starts from the bucket, picks up the nearest potato, runs back with it, drops it in the bucket, runs back to pick up the next potato, and so on. Based on the above information, answer the following questions:

(i) What distance does a competitor run to bring the first potato to the bucket? *1*

(ii) What distance does a competitor run to bring the 10^{th} potato to the bucket? *1*

(iii) (a) Find the total distance a competitor runs to put all ten potatoes in the bucket. *2*

OR

(iii) (b) If there were only 8 potatoes, find the total distance the competitor would run. *2*

38. Hanif tosses a coin 3 times and notes the outcome each time. He wins if all the tosses give the same result, i.e. three heads or three tails, and loses otherwise. Based on the above information, answer the following questions:

(i) Write the total number of possible outcomes. *1*

(ii) Find the probability of getting three heads. *1*

(iii) (a) Find the probability that Hanif will lose the game. *2*

OR

(iii) (b) Find the probability of getting exactly two heads. *2*

• • • End of Question Paper • • •

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