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/03

MATHEMATICS (BASIC)

Class X • Sample Paper 03 • 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. The HCF of the smallest prime number and the smallest composite number is:

(A) 2 (B) 4 (C) 6 (D) 8

2. If one zero of the quadratic polynomial $x^2 + 3x + k$ is 2, then the value of k is:

(A) 10 (B) -10 (C) 5 (D) -5

3. The lines represented by $x = a$ and $y = b$ are:

(A) parallel (B) intersecting at (a, b)

(C) coincident (D) intersecting at (b, a)

4. The sum of the ages of Anu and Binu is 30 years and Anu is 6 years older than Binu. Anu's age is:

(A) 12 years (B) 18 years (C) 24 years (D) 15 years

5. Which of the following is a quadratic equation?

(A) $x^2 + \frac{1}{x^2} = 2$ (B) $x(x+3) = x^2 + 5$ (C) $(x-2)^2 + 1 = 2x - 3$ (D) $x^3 + x = 4$

6. The 11^{th} term from the last term of the A.P. $10, 7, 4, \ldots, -62$ is:

(A) -32 (B) -25 (C) 38 (D) -29

7. The sum of the first 15 multiples of 4 is:

(A) 480 (B) 420 (C) 360 (D) 500

8. If $P(2, p)$ is the mid-point of the line segment joining the points $A(6, -5)$ and $B(-2, 11)$, then the value of p is:

(A) 3 (B) -3 (C) 4 (D) 6

9. If $P(E) = 0.07$, then the probability of 'not E' is:

(A) 0.93 (B) 0.07 (C) 0.7 (D) 1.07

10. The lower limit of the median class of the following distribution is:

Class	10–20	20–30	30–40	40–50	50–60
Frequency	3	9	15	11	2

(A) 20 (B) 30 (C) 40 (D) 35

11. A tangent PQ at a point P of a circle of radius 5 cm meets a line through the centre O at a point Q so that $OQ = 12$ cm. The length of PQ is:

(A) 12 cm (B) 13 cm (C) 8.5 cm (D) $\sqrt{119}$ cm

12. The empirical relationship between the three measures of central tendency is:

(A) $3\,\text{Median} = \text{Mode} + 2\,\text{Mean}$ (B) $2\,\text{Median} = \text{Mode} + 3\,\text{Mean}$

(C) $3\,\text{Mode} = \text{Median} + 2\,\text{Mean}$ (D) $\text{Mode} = 3\,\text{Mean} - 2\,\text{Median}$

13. The angle of depression of a car parked on the road from the top of a 20 m high building is 30°. The distance of the car from the building is:

(A) $20\sqrt{3}$ m (B) 20 m (C) $\frac{20}{\sqrt{3}}$ m (D) 40 m

14. The value of $9\sec^2 A - 9\tan^2 A$ is:

(A) 1 (B) 9 (C) 8 (D) 0

15. The perimeters of two similar triangles are 30 cm and 20 cm. If one side of the first triangle is 12 cm, the corresponding side of the second triangle is:

(A) 8 cm (B) 18 cm (C) 15 cm (D) 10 cm

16. If $\triangle ABC \sim \triangle DEF$, $\angle A = 47^\circ$ and $\angle E = 83^\circ$, then $\angle C$ is:

(A) 50° (B) 47° (C) 83° (D) 130°

17. If tangents PA and PB from a point P to a circle with centre O are inclined to each other at an angle of 80°, then $\angle POA$ is equal to:

(A) 50° (B) 60° (C) 70° (D) 80°

18. Two cubes, each of volume 27 cm^3, are joined end to end. The surface area of the resulting cuboid is:

(A) 90 cm^2 (B) 108 cm^2 (C) 54 cm^2 (D) 72 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) :* A bag contains 3 red and 5 black balls. The probability of drawing a red ball from it is $\frac{3}{5}$.

Reason (R) : Probability of an event $= \frac{\text{number of outcomes favourable to it}}{\text{total number of possible outcomes}}$.

20. *Assertion (A) :* D and E are points on the sides AB and AC of $\triangle ABC$ such that $AD = 2$ cm, $AB = 6$ cm, $AE = 3$ cm and $AC = 9$ cm. Then $DE \parallel BC$.

Reason (R) : If a line divides any two sides of a triangle in the same ratio, then the line is parallel to the third side.

SECTION B

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

21. (a) Find the HCF and LCM of 12, 15 and 21 using the prime factorisation method.

OR

(b) Show that $5 \times 4 \times 3 \times 2 \times 1 + 5$ is a composite number.

22. If $\sin\theta = \cos\theta$, $0° < \theta < 90°$, find the value of $2\tan\theta + \cos^2\theta$.

23. Find a quadratic polynomial, the sum and product of whose zeroes are $-\frac{1}{4}$ and $\frac{1}{4}$ respectively.

24. A circle touches all the four sides of a quadrilateral $ABCD$. If $AB = 6$ cm, $BC = 7$ cm and $CD = 4$ cm, find AD.

25. (a) Find the coordinates of the point which divides the line segment joining $A(-1, 3)$ and $B(4, -7)$ internally in the ratio $2 : 3$.

OR

(b) If the distance between the points $(4, k)$ and $(1, 0)$ is 5 units, find the possible values of k.

SECTION C

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

26. Given that $\sqrt{7}$ is irrational, prove that $3 + \sqrt{7}$ is an irrational number.

27. (a) Prove that in two concentric circles, the chord of the larger circle which touches the smaller circle is bisected at the point of contact.

OR

(b) A circle touches the side BC of $\triangle ABC$ at P and touches AB and AC produced at Q and R respectively. Show that $AQ = \frac{1}{2}$ (perimeter of $\triangle ABC$).

28. If the points $A(2, 1)$, $B(5, 3)$, $C(p, 6)$ and $D(1, 4)$ are the vertices of a parallelogram $ABCD$, taken in order, find the value of p.

29. Prove that: $\sqrt{\frac{1+\sin A}{1-\sin A}} = \sec A + \tan A$

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

Class	10–25	25–40	40–55	55–70	70–85	85–100
Frequency	2	3	7	6	6	6

OR

(b) The number of cars passing a spot on a road in intervals of 3 minutes over 100 periods is given below. Find the mode of the data.

No. of cars	0–10	10–20	20–30	30–40	40–50	50–60	60–70	70–80
Frequency	7	14	13	12	20	11	15	8

31. The taxi charges in a city consist of a fixed charge together with a charge per km. For a journey of 10 km the charge paid is ₹ 105 and for a journey of 15 km the charge paid is ₹ 155. Find the fixed charge and the charge per km. How much does a person pay for a journey of 25 km?

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 the following: P is a point outside $\triangle OQR$ such that D is a point on PO, E on PQ and F on PR with $DE \parallel OQ$ and $DF \parallel OR$. Show that $EF \parallel QR$.

33. (a) A motor boat whose speed is 18 km/h in still water takes 1 hour more to go 24 km upstream than to return downstream to the same spot. Find the speed of the stream.

OR

(b) The sum of the squares of two consecutive odd positive integers is 290. Find the integers.

34. A vessel is in the form of a hollow hemisphere mounted by a hollow cylinder. The diameter of the hemisphere is 14 cm and the total height of the vessel is 13 cm. Find the inner surface area and the capacity of the vessel.

35. (a) From the top of a 45 m high building, the angles of depression of the top and the bottom of a pole are 30° and 45° respectively. Find the height of the pole. (Use $\sqrt{3} = 1.732$)

OR

(b) A tree breaks due to a storm and the broken part bends so that the top of the tree touches the ground making an angle of 30° with it. The distance between the foot of the tree and the point where the top touches the ground is 8 m. Find the height of the tree. (Use $\sqrt{3} = 1.732$)

SECTION E

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

36. A car has two wipers which do not overlap. Each wiper has a blade of length 21 cm sweeping through an angle of 120°. Based on the above information, answer the following questions:

(i) Find the area cleaned by one wiper at each sweep. *1*

(ii) Find the length of the arc traced by the tip of one blade. *1*

(iii) (a) Find the total area cleaned at each sweep of both the blades. *2*

OR

(iii) (b) If the sweeping angle of each blade is reduced to 90°, by how much will the area cleaned by one blade decrease? *2*

37. Rohan repays a loan of ₹ 3250 in monthly instalments. He pays ₹ 20 in the first month and then increases the instalment by ₹ 15 every month. Based on the above information, answer the following questions:

(i) How much does he pay in the 5^{th} month? *1*

(ii) How much does he pay in the 20^{th} month? *1*

(iii) (a) In how many months will he clear the loan? *2*

OR

(iii) (b) Find the total amount he pays in the first 10 months. *2*

38. A piggy bank contains hundred 50 p coins, fifty ₹ 1 coins, twenty ₹ 2 coins and ten ₹ 5 coins. It is shaken so that one coin falls out at random. Based on the above information, answer the following questions:

(i) Find the probability that the coin which fell out is a 50 p coin. *1*

(ii) Find the probability that the coin is a ₹ 5 coin. *1*

(iii) (a) Find the probability that the value of the coin is ₹ 1 or more. *2*

OR

(iii) (b) If twenty more ₹ 2 coins are put into the piggy bank, find the probability that a coin falling out is a ₹ 2 coin. *2*

• • • End of Question Paper • • •

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