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/09

MATHEMATICS (BASIC)

Class X • Sample Paper 09 • 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 any two consecutive even natural numbers is:

(A) 2 (B) 1 (C) 4 (D) 0

2. If the zeroes of the quadratic polynomial $x^2 + (a+1)x + b$ are 2 and -3, then:

(A) $a = 0,\ b = -6$ (B) $a = 2,\ b = -6$ (C) $a = -7,\ b = -1$ (D) $a = 5,\ b = -1$

3. Graphically, the pair of linear equations $6x - 3y + 10 = 0$ and $2x - y + 9 = 0$ represents two lines which are:

(A) intersecting at exactly one point (B) parallel

(C) coincident (D) intersecting at exactly two points

4. The present ages of Asha and Bela are in the ratio $5:4$ and the sum of their ages is 45 years. Asha's present age is:

(A) 25 years (B) 20 years (C) 30 years (D) 15 years

5. Which of the following equations has 2 as a root?

(A) $x^2-4x+5=0$ (B) $x^2+3x-12=0$ (C) $2x^2-7x+6=0$ (D) $3x^2-6x-2=0$

6. The first negative term of the A.P. $20,\ 19\frac{1}{4},\ 18\frac{1}{2},\ 17\frac{3}{4},\ \ldots$ is its:

(A) 27^{th} term (B) 28^{th} term (C) 29^{th} term (D) 26^{th} term

7. If the n^{th} term of an A.P. is $4n-3$, then the sum of its first 10 terms is:

(A) 190 (B) 180 (C) 200 (D) 370

8. If $(3,5)$ is the mid-point of the line segment joining $(x,6)$ and $(4,y)$, then $x+y$ is:

(A) 6 (B) 5 (C) 7 (D) 8

9. In a game which cannot end in a draw, the probability of Reena losing is 0.47. The probability of her winning is:

(A) 0.53 (B) 0.47 (C) 1.47 (D) 0

10. The modal class of the following distribution is:

Class	10–20	20–30	30–40	40–50	50–60
Frequency	3	8	12	7	5

(A) 20–30 (B) 30–40 (C) 40–50 (D) 10–20

11. Two tangents PA and PB are drawn to a circle with centre O and radius r from a point P such that $OP=2r$. Then $\angle APB$ is:

(A) 60° (B) 30° (C) 90° (D) 45°

12. If the mean and the median of a distribution are 18.8 and 19 respectively, then its mode is:

(A) 19.4 (B) 19.2 (C) 18.6 (D) 20

13. A kite is attached to a 100 m long string which makes an angle of 30° with the ground. Assuming the string to be straight, the height of the kite is:

(A) 50 m (B) $50\sqrt{3}$ m (C) 100 m (D) 25 m

14. If $\cos A=\dfrac{4}{5}$, where A is acute, then $\cot A$ is:

(A) $\dfrac{4}{3}$ (B) $\dfrac{3}{4}$ (C) $\dfrac{3}{5}$ (D) $\dfrac{5}{3}$

15. In $\triangle ABC$, $AB=6\sqrt{3}$ cm, $AC=12$ cm and $BC=6$ cm. The measure of $\angle B$ is:

(A) 90° (B) 60° (C) 45° (D) 120°

16. Which of the following pairs of triangles, whose sides are given, are similar?

(A) 3, 4, 5 and 6, 8, 10 (B) 2, 3, 4 and 4, 6, 7

(C) 1, 2, 3 and 2, 3, 4 (D) 5, 6, 7 and 10, 12, 13

17. The number of tangents that can be drawn to a circle from a point outside it is:

(A) 1 (B) 2

(C) 0 (D) infinitely many

18. The surface area of a sphere of radius 7 cm is:

(A) 616 cm^2 (B) 154 cm^2 (C) 1232 cm^2 (D) 308 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) :* When a die is thrown once, the probability of getting a number less than 7 is 1.

Reason (R) : The probability of a sure event is 1.

20. *Assertion (A) :* In $\triangle ABC$, $DE \parallel BC$ with D on AB and E on AC. If $AD = 3$ cm, $DB = 2$ cm and $AE = 6$ cm, then $EC = 5$ 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 90 and 144 by the prime factorisation method.

OR

(b) Show that 12^n cannot end with the digit 0 or 5 for any natural number n.

22. If $\sqrt{3}\tan\theta = 3\sin\theta$, where θ is acute, find the value of $\sin^2\theta - \cos^2\theta$.

23. Find a quadratic polynomial, the sum and product of whose zeroes are $\sqrt{2}$ and $\frac{1}{3}$ respectively.

24. From an external point P, tangents PA and PB are drawn to a circle with centre O. If $\angle PAB = 50°$, find $\angle AOB$.

25. (a) Show that the points $(-2, 0)$, $(2, 0)$ and $(0, 2)$ are the vertices of an isosceles right triangle.

OR

(b) Find the mid-point and the length of the line segment joining $(-2, -3)$ and $(6, 3)$.

SECTION C

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

26. Given that $\sqrt{2}$ is irrational, prove that $6 - 5\sqrt{2}$ is an irrational number.

27. (a) In a right triangle ABC with $\angle B = 90°$, a circle with AB as diameter intersects the hypotenuse AC at D. Prove that the tangent to the circle at D bisects BC.

OR

(b) Two tangents inclined to each other at an angle of $60°$ are drawn to a circle of radius 3 cm from an external point. Find the length of each tangent.

28. Find the ratio in which the y-axis divides the line segment joining $A(-4, -1)$ and $B(6, 4)$. Also find the point of division.

29. Prove that: $\left(1 + \frac{1}{\tan^2 A}\right)\left(1 + \frac{1}{\cot^2 A}\right) = \frac{1}{\sin^2 A - \sin^4 A}$

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

Class	5–15	15–25	25–35	35–45	45–55
Frequency	6	10	14	6	4

OR

(b) Find the mode of the following distribution:

Class	0–20	20–40	40–60	60–80	80–100	100–120
Frequency	10	35	52	61	38	29

31. In $\triangle ABC$, $\angle C = 3\angle B = 2(\angle A + \angle B)$. Form a pair of linear equations and find the three angles.

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: In $\triangle ABC$, D is a point on AB and E a point on BC such that $DE \parallel AC$; F is a point on BE such that $DF \parallel AE$. Show that $\frac{BF}{FE} = \frac{BE}{EC}$.

33. (a) An aeroplane left 30 minutes later than its scheduled time. In order to reach its destination 1500 km away on time, it had to increase its speed by 100 km/h from its usual speed. Find its usual speed.

OR

(b) A natural number, when increased by 12, becomes equal to 160 times its reciprocal. Find the number.

34. A solid consisting of a right circular cone of height 120 cm and radius 60 cm, standing on a hemisphere of radius 60 cm, is placed upright in a right circular cylinder full of water such that it touches the bottom. Find the volume of water left in the cylinder, if the radius of the cylinder is 60 cm and its height is 180 cm.

35. (a) A straight highway leads to the foot of a tower. A man standing at the top of the tower observes a car at an angle of depression of 30°, which is approaching the foot of the tower with a uniform speed. Six seconds later, the angle of depression of the car is found to be 60°. Find the time taken by the car to reach the foot of the tower from this point.

OR

(b) The angles of depression of the top and the bottom of an 8 m tall building from the top of a multi-storeyed building are 30° and 45° respectively. Find the height of the multi-storeyed building and the distance between the two buildings. (Use $\sqrt{3} = 1.732$)

SECTION E

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

36. A lighthouse spreads a red-coloured light over a sector of angle 80° to a distance of 16.5 km, to warn ships of underwater rocks. (Use $\pi = 3.14$) Based on the above information, answer the following questions:

(i) Find the area of the sea over which the ships are warned. *1*

(ii) Find the length of the outer boundary arc of the lit region. *1*

(iii) (a) If the angle of the sector is increased to 120°, find the increase in the warned area. *2*

OR

(iii) (b) Find the warned area if the light reaches only half the distance (8.25 km), the angle remaining 80°. *2*

37. A sum of ₹ 700 is to be used to give seven cash prizes to students of a school for their overall academic performance. Each prize is ₹ 20 less than its preceding prize. Based on the above information, answer the following questions:

(i) Find the value of the first prize. *1*

(ii) Find the value of the last prize. *1*

(iii) (a) Find the total value of the first three prizes. *2*

OR

(iii) (b) If, instead, each prize were ₹ 10 less than its preceding prize, find the value of the first prize. *2*

38. A box contains 400 bulbs, out of which 15 are defective. One bulb is taken out at random from the box. Based on the above information, answer the following questions:

(i) Find the probability that it is defective. *1*

(ii) Find the probability that it is not defective. *1*

(iii) (a) Suppose the bulb drawn is defective and is not replaced. Another bulb is now drawn at random. Find the probability that this bulb is not defective. *2*

OR

(iii) (b) If 25 more non-defective bulbs are added to the original box, find the probability that a bulb drawn is defective. *2*

• • • End of Question Paper • • •

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