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/02

MATHEMATICS (BASIC)

Class X • Sample Paper 02 • 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 of two numbers a and b is 12 and $a \times b = 1800$, then their LCM is:

(A) 150 (B) 90 (C) 180 (D) 300

2. A quadratic polynomial whose zeroes are 3 and -4 is:

(A) $x^2 - x - 12$ (B) $x^2 + x - 12$ (C) $x^2 - 7x + 12$ (D) $x^2 + 7x - 12$

3. The pair of linear equations $x + 2y = 5$ and $3x + 12y = 10$ has:

(A) a unique solution (B) no solution

(C) infinitely many solutions (D) exactly two solutions

4. A father's age is three times the age of his son. After 10 years, the father's age will be twice the age of his son. The present age of the son is:

(A) 10 years (B) 20 years (C) 30 years (D) 15 years

5. The values of k for which the quadratic equation $2x^2 + kx + 3 = 0$ has two equal roots are:

(A) $\pm 2\sqrt{6}$ (B) ± 6 (C) $\pm\sqrt{6}$ (D) ± 4

6. The common difference of the A.P. $\frac{1}{p}, \frac{1-p}{p}, \frac{1-2p}{p}, \ldots$ is:

(A) p (B) $-p$ (C) -1 (D) 1

7. The number of two-digit numbers which are divisible by 7 is:

(A) 12 (B) 13 (C) 14 (D) 15

8. The point which divides the line segment joining the points $(-1, 7)$ and $(4, -3)$ internally in the ratio $2 : 3$ is:

(A) $(1, 3)$ (B) $(2, 1)$ (C) $(1, -3)$ (D) $(3, 1)$

9. A letter is chosen at random from the letters of the word MATHEMATICS. The probability that it is the letter M is:

(A) $\frac{1}{11}$ (B) $\frac{2}{11}$ (C) $\frac{3}{11}$ (D) $\frac{4}{11}$

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

Marks	0–20	20–40	40–60	60–80	80–100
No. of students	4	10	16	6	4

(A) 40 (B) 60 (C) 80 (D) 20

11. PA and PB are tangents drawn from an external point P to a circle. If $PA = 12$ cm and $\angle APB = 60^\circ$, then the length of the chord AB is:

(A) 12 cm (B) 6 cm (C) $12\sqrt{3}$ cm (D) $6\sqrt{3}$ cm

12. If the mode and the mean of a data are 12 and 18 respectively, then its median is:

(A) 14 (B) 16 (C) 15 (D) 17

13. If the length of the shadow of a tower is $\sqrt{3}$ times its height, then the angle of elevation of the sun is:

(A) 30° (B) 45° (C) 60° (D) 90°

14. If $\tan A = \frac{3}{4}$, where A is an acute angle, then $\sin A$ is:

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

15. $\triangle ABC \sim \triangle PQR$ with $BC = 8$ cm and $QR = 6$ cm. If the perimeter of $\triangle ABC$ is 32 cm, then the perimeter of $\triangle PQR$ is:

(A) 24 cm (B) 18 cm (C) 42 cm (D) 28 cm

16. In $\triangle ABC$ and $\triangle DEF$, $\frac{AB}{DE} = \frac{BC}{FD}$. The two triangles will be similar if:

(A) $\angle B = \angle E$ (B) $\angle A = \angle D$ (C) $\angle B = \angle D$ (D) $\angle A = \angle F$

17. AB is a chord of a circle with centre O and AT is the tangent at A. If $\angle BAT = 60^\circ$, then $\angle AOB$ is:

(A) 60° (B) 120° (C) 30° (D) 90°

18. The curved surface area of a cone of base radius 7 cm and slant height 10 cm is:

(A) 220 cm^2 (B) 154 cm^2 (C) 440 cm^2 (D) 374 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 getting a prime number when a die is thrown once is $\frac{1}{2}$.

Reason (R) : When a die is thrown once, there are 6 possible outcomes, of which 3 are odd numbers.

20. *Assertion (A) :* In $\triangle PQR$, $ST \parallel QR$ with S on PQ and T on PR. If $\frac{PS}{SQ} = \frac{3}{5}$ and $PR = 28$ cm, then $PT = 10.5$ 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 336 and 54 by prime factorisation and verify that HCF $\times$ LCM = product of the numbers.

OR

(b) Find the largest number which divides 245 and 1029 leaving a remainder 5 in each case.

22. If $\sin(A-B) = \frac{1}{2}$ and $\cos(A+B) = \frac{1}{2}$, $0^\circ < A+B \leq 90^\circ$, $A > B$, find A and B.

23. If one zero of the polynomial $3x^2 + 8x + k$ is the reciprocal of the other, find the value of k.

24. Two concentric circles are of radii 5 cm and 3 cm. Find the length of the chord of the larger circle which touches the smaller circle.

25. (a) Find the coordinates of the point which divides the line segment joining the points $(4, -3)$ and $(8, 5)$ internally in the ratio $3 : 1$.

OR

(b) Find the perimeter of the triangle whose vertices are $(0, 4)$, $(0, 0)$ and $(3, 0)$.

SECTION C

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

26. Given that $\sqrt{2}$ is irrational, prove that $7 - 2\sqrt{2}$ is an irrational number.

27. (a) A circle is inscribed in $\triangle ABC$ touching the sides AB, BC and CA at D, E and F respectively. If $AB = 10$ cm, $BC = 8$ cm and $CA = 12$ cm, find the lengths AD, BE and CF.

OR

(b) PA and PB are tangents drawn from an external point P to a circle with centre O. Prove that OP is the perpendicular bisector of AB.

28. Find the coordinates of the points of trisection of the line segment joining $A(2, -2)$ and $B(-7, 4)$.

29. Prove that: $(\text{cosec}\,\theta - \cot\theta)^2 = \dfrac{1-\cos\theta}{1+\cos\theta}$

30. (a) The daily wages of 50 workers of a factory are given below. Find the mean daily wages.

Daily wages (in ₹)	100–120	120–140	140–160	160–180	180–200
No. of workers	12	14	8	6	10

OR

(b) Find the mode of the following distribution:

Class	0–10	10–20	20–30	30–40	40–50	50–60	60–70
Frequency	8	10	10	16	12	6	7

31. A fraction becomes $\dfrac{9}{11}$ if 2 is added to both its numerator and denominator. If 3 is added to both the numerator and the denominator, it becomes $\dfrac{5}{6}$. Find the fraction.

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, find the value of x if in $\triangle ABC$, $DE \parallel BC$ with D on AB and E on AC, $AD = (4x-3)$ cm, $DB = (3x-1)$ cm, $AE = (8x-7)$ cm and $EC = (5x-3)$ cm.

33. (a) The sum of the reciprocals of Rehman's ages (in years) 3 years ago and 5 years from now is $\dfrac{1}{3}$. Find his present age.

OR

(b) Two water taps together can fill a tank in $9\dfrac{3}{8}$ hours. The tap of larger diameter takes 10 hours less than the smaller one to fill the tank separately. Find the time in which each tap can separately fill the tank.

34. A wooden article was made by scooping out a hemisphere from each end of a solid cylinder. The height of the cylinder is 10 cm and its base radius is 3.5 cm. Find the total surface area of the article and the volume of wood left.

35. (a) The angle of elevation of the top of a building from the foot of a tower is $30°$ and the angle of elevation of the top of the tower from the foot of the building is $60°$. If the tower is 50 m high, find the height of the building.

OR

(b) From a point P on the ground, the angle of elevation of the top of a 10 m tall building is $30°$. A flag is hoisted at the top of the building and the angle of elevation of the top of the flagstaff from P is $45°$. Find the length of the flagstaff and the distance of the building from P. (Use $\sqrt{3} = 1.732$)

SECTION E

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

36. A circular pizza of radius 14 cm is cut into 8 equal slices by cuts through its centre. Based on the above information, answer the following questions:

(i) Find the angle of each slice at the centre. *1*

(ii) Find the area of the top surface of each slice. *1*

(iii) (a) Find the perimeter of one slice. *2*

OR

(iii) (b) If 3 slices are eaten, find the area of the top surface of the remaining pizza. *2*

37. In an auditorium, there are 24 seats in the first row, 26 seats in the second row, 28 seats in the third row and so on. There are 20 rows in all. Based on the above information, answer the following questions:

(i) How many seats are there in the 10^{th} row? *1*

(ii) How many seats are there in the last row? *1*

(iii) (a) Find the total number of seats in the auditorium. *2*

OR

(iii) (b) How many rows (from the front) together contain 330 seats? *2*

38. In a board game, two players throw a pair of dice simultaneously and move their counters according to the outcomes. Based on the above information, answer the following questions:

(i) Find the probability of getting a sum of 7. *1*

(ii) Find the probability of getting a sum of 11. *1*

(iii) (a) Find the probability of getting a sum of 10 or more. *2*

OR

(iii) (b) Find the probability that the product of the numbers on the two dice is even. *2*

• • • End of Question Paper • • •

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