Series MC-X-STD

Roll No. | | | | | | | |

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

Q.P. Code
MC/X/S/07

MATHEMATICS (STANDARD)

Class X • Sample Paper 07 • Session 2026–27

(As per the CBSE Sample Question Paper 2026–27 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 ratio of the LCM and the HCF of the least composite number and the least prime number is:

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

2. The zeroes of the quadratic polynomial $x^2 + 4\sqrt{3}x + 12$ are:

(A) both positive and repeated (B) both negative and repeated

(C) one positive and one negative (D) both negative and distinct

3. The value of k for which the pair of equations $kx = y + 2$ and $6x = 2y + 3$ has infinitely many solutions:

(A) is $k = 3$ (B) does not exist

(C) is $k = -3$ (D) is $k = 4$

4. The value of k for which the quadratic equation $kx^2 - 2kx + 6 = 0$ has two equal roots is:

(A) 2 (B) 3 (C) 4 (D) 6

5. If the 7^{th} term of an A.P. is $\frac{1}{9}$ and its 9^{th} term is $\frac{1}{7}$, then its common difference is:

(A) 0 (B) 1 (C) $\frac{1}{63}$ (D) 63

6. In $\triangle ABC$, $DE \parallel BC$ with D on AB and E on AC. If $\frac{AD}{DB} = \frac{2}{3}$ and $AE = 4$ cm, then AC is:

(A) 10 cm (B) 6 cm (C) 8 cm (D) 12 cm

7. The ratio in which the x-axis divides the line segment joining $A(3, 6)$ and $B(-12, -3)$ is:

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

8. If $\sin\theta = \frac{1}{3}$, then the value of $(2\cot^2\theta + 2)$ is:

(A) 9 (B) 12 (C) 15 (D) 18

9. In a group of 20 people, 5 cannot swim. If one person is selected at random, the probability that he/she can swim is:

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

10. The angle swept by the minute hand of a clock between 7:20 a.m. and 7:55 a.m. is:

(A) 210° (B) 180° (C) 35° (D) 70°

11. The curved surface area of a cone of height 24 cm and base radius 7 cm is:

(A) 528 cm^2 (B) 1056 cm^2 (C) 550 cm^2 (D) 500 cm^2

12. If the mean of the observations $6,\ 7,\ x,\ 8,\ y,\ 14$ is 9, then $x + y$ is:

(A) 19 (B) 21 (C) 17 (D) 20

13. A number x is chosen at random from $-3, -2, -1, 0, 1, 2, 3$. The probability that $x^2 < 4$ is:

(A) $\frac{3}{7}$ (B) $\frac{4}{7}$ (C) $\frac{2}{7}$ (D) $\frac{5}{7}$

14. The distance of the point $(6, -2)$ from the x-axis is:

(A) 2 units (B) -2 units (C) 6 units (D) -6 units

15. The perimeter of a square circumscribing a circle of radius a cm is:

(A) $8a$ cm (B) $4a$ cm (C) $2a$ cm (D) $16a$ cm

16. The mean of five observations is 15. If the mean of the first three is 14 and that of the last three is 17, the third observation is:

(A) 18 (B) 15 (C) 16 (D) 20

17. A ladder makes an angle of 60° with the ground when placed against a wall. If its foot is 2 m away from the wall, the length of the ladder is:

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

18. A card is selected at random from a well-shuffled deck of 52 cards. The probability that it is a red face card is:

(A) $\frac{3}{13}$ (B) $\frac{3}{26}$ (C) $\frac{1}{13}$ (D) $\frac{1}{26}$

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*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) :* $P(0, 2)$ is the point of intersection of the y-axis with the line $3x + 2y = 4$.
Reason (R) : The distance of the point $P(0, 2)$ from the x-axis is 2 units.

20. *Assertion (A) :* If $(2k+1)$, $(3k+3)$ and $(5k-1)$ are three consecutive terms of an A.P., then $k = 6$.
Reason (R) : The sum of the first n terms of an A.P. is $S_n = \frac{n}{2}[2a + (n-1)d]$.

SECTION B

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

21. (a) If the HCF of 144 and 180 is expressed in the form $13m - 3$, find the value of m.

OR

(b) Explain why $7 \times 11 \times 13 + 13$ is a composite number.

22. (a) In $\triangle ABC$, P and Q are points on AB and AC such that $AP = 3$ cm, $PB = 4.5$ cm, $AQ = 2$ cm and $QC = 3$ cm. Is $PQ \parallel BC$? Justify.

OR

(b) In $\triangle ABC$, $\angle ACB = 90^\circ$ and $CD \perp AB$. Prove that $\frac{BC^2}{AC^2} = \frac{BD}{AD}$.

23. Find x if $2\operatorname{cosec}^2 30^\circ + x \sin^2 60^\circ - \frac{3}{4}\tan^2 30^\circ = 10$.

24. A round table cover has six equal designs, each a segment of the circle cut off by a side of a regular hexagon inscribed in it. If the radius of the cover is 28 cm, find the cost of making the designs at ₹ 0.35 per cm^2. (Use $\sqrt{3} = 1.7$)

25. Cards marked with the numbers $4, 5, 6, \ldots, 39$ are put in a box. A card is drawn at random. Find the probability that the number on it is a multiple of 3 or 7.

SECTION C

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

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

27. If α and β are the zeroes of the polynomial $x^2 - 5x + k$ such that $\alpha - \beta = 1$, find the value of k and the zeroes.

28. (a) 250 logs are stacked with 22 logs in the bottom row, 21 in the next row, 20 in the row next to it, and so on. In how many rows are the 250 logs placed and how many logs are in the top row?

OR

(b) The first term of an A.P. is 10 and the sum of its first 14 terms is 1050. Find its 20^{th} term.

29. A circle is inscribed in a quadrilateral $ABCD$ in which $\angle B = 90^\circ$. If $AD = 17$ cm, $AB = 20$ cm and $DS = 3$ cm, where S is the point of contact on AD, find the radius of the circle.

30. The centre of a circle is $(2a, a - 7)$. Find the values of a if the circle passes through the point $(11, -9)$ and its radius is $5\sqrt{2}$ units.

31. (a) Prove that: $(\text{cosec}A - \sin A)(\sec A - \cos A) = \dfrac{1}{\tan A + \cot A}$

OR

(b) Prove that: $\dfrac{\tan\theta + \sec\theta - 1}{\tan\theta - \sec\theta + 1} = \dfrac{1 + \sin\theta}{\cos\theta}$

SECTION D

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

32. A train travels at a certain average speed for a distance of 54 km and then travels 63 km at an average speed 6 km/h more than the first speed. If it takes 3 hours to complete the whole journey, find its first average speed.

33. CD and RS are respectively the medians of $\triangle ABC$ and $\triangle PQR$, where $\triangle ABC \sim \triangle PQR$. Prove that (i) $\triangle ADC \sim \triangle PSR$, (ii) $AD \times PR = AC \times PS$, (iii) $\triangle CDB \sim \triangle RSQ$.

34. (a) A room is in the form of a cylinder surmounted by a hemispherical dome. The base radius of the hemisphere is one-half the height of the cylindrical part. Find the total height of the room if it contains $\dfrac{1408}{21}$ m^3 of air.

OR

(b) An empty cone of radius 3 cm and height 12 cm is filled with ice-cream so that the lower part of the cone, which is $\dfrac{1}{6}$ of its volume, is unfilled, and a hemisphere of ice-cream is formed on the top. Find the volume of the ice-cream. (Take $\pi = 3.14$)

35. (a) From a balloon vertically above a straight road, the angles of depression of two cars on opposite sides of the balloon are 45° and 60°. If the cars are 100 m apart, find the height of the balloon. (Use $\sqrt{3} = 1.73$)

OR

(b) A guard at the top of a 300 m high tower observes a boat coming towards the tower at an angle of depression of 30°. After 10 minutes the boat's distance from the tower is reduced by $300(\sqrt{3} - 1)$ m. Find the new angle of depression and the speed of the boat. (Use $\sqrt{3} = 1.732$)

SECTION E

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

36. A ball is thrown upwards. Its height h (in metres) above the starting point after t seconds is given by $h = 25t - 5t^2$. Based on the above information, answer the following questions:

(i) Find the zeroes of the polynomial $25t - 5t^2$. *1*

(ii) Find the maximum height reached by the ball. *1*

(iii) (a) After how much time does the ball first reach a height of 30 m? *2*

OR

(iii) (b) Find the two values of t when the ball is at a height of 20 m. *2*

37. A building 20 m high casts a shadow 10 m long on the ground. At the same time, a tower casts a shadow 50 m long and a student's house casts a shadow 20 m long. Based on the above information, answer the following questions:

(i) What is the height of the tower? *1*

(ii) What is the height of the student's house? *1*

(iii) (a) Find the length of the shadow of the tower when the building casts a shadow of 12 m. *2*

OR

(iii) (b) When the tower casts a shadow of 40 m, find the length of the shadow of the house. *2*

38. Two friends play a game with a pair of dice. Each states a condition before throwing the pair; if the numbers satisfy the condition, he wins. Based on the above information, answer the following questions:

(i) The first friend says "6 will come up on both dice". Find the probability of his losing. *1*

(ii) The first friend now says "a doublet". Find the probability of his winning. *1*

(iii) (a) The second friend says "the sum is not an even number". Find the probability of his losing. *2*

OR

(iii) (b) The second friend says "the sum is at most 9". Find the probability of his winning. *2*

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