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/04

MATHEMATICS (STANDARD)

Class X • Sample Paper 04 • 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. If a is the smallest prime number and b is the greatest one-digit composite number, then HCF(a,b) + LCM(a,b) is:

(A) 19 (B) 18 (C) 20 (D) 10

2. If -3 is one of the zeroes of the polynomial $(k-1)x^2+kx+1$, then the value of k is:

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

3. The value of k for which the system of equations $3x-ky=7$ and $6x+10y=3$ is inconsistent is:

(A) -10 (B) -5 (C) 5 (D) 7

4. The roots of the quadratic equation $x^2 + x - 1 = 0$ are:

(A) irrational and distinct (B) not real

(C) rational and distinct (D) real and equal

5. Which term of the A.P. $21, 18, 15, \ldots$ is -81?

(A) 33^{rd} (B) 34^{th} (C) 35^{th} (D) 36^{th}

6. If $\triangle ABC \sim \triangle DEF$ such that $2AB = DE$ and $BC = 8$ cm, then EF is:

(A) 16 cm (B) 12 cm (C) 8 cm (D) 4 cm

7. The coordinates of P and Q are $(4, -3)$ and $(-1, 7)$. The abscissa of the point R on PQ such that $PR : PQ = 3 : 5$ is:

(A) 5 (B) -5 (C) 8 (D) 1

8. If $\tan\theta = \frac{3}{4}$, $0^\circ < \theta < 90^\circ$, then the value of $\sin\theta\cos\theta$ is:

(A) $\frac{7}{25}$ (B) $\frac{12}{25}$ (C) $\frac{24}{25}$ (D) $\frac{3}{5}$

9. A die is thrown once. The probability of getting a number which is a prime or greater than 4 is:

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

10. The outer and inner diameters of a circular path are 10 m and 6 m respectively. The area of the path is:

(A) 16π m^2 (B) 64π m^2 (C) 4π m^2 (D) 8π m^2

11. A solid sphere is cut into two hemispheres. The ratio of the surface area of the sphere to the total surface area of the two hemispheres is:

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

12. For a data $x_1, x_2, \ldots, x_n$ with frequencies $f_1, f_2, \ldots, f_n$ and mean $\bar{x}$, the value of $\sum f_i(x_i - \bar{x})$ is:

(A) $n\bar{x}$ (B) 1 (C) $\sum f_i$ (D) 0

13. Two dice are thrown at the same time. The probability of getting different numbers on them is:

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

14. The points on the x-axis which are at a distance of $2\sqrt{5}$ units from the point $(7, -4)$ are:

(A) $(5,0)$ and $(9,0)$ (B) $(3,0)$ and $(11,0)$

(C) $(5,0)$ only (D) $(9,0)$ only

15. The circumferences of two circles are in the ratio 4 : 9. The ratio of their areas is:

(A) 9 : 4 (B) 4 : 9 (C) 16 : 81 (D) 2 : 3

16. If the mean of the first n natural numbers is 15, then n is:

(A) 15 (B) 29 (C) 30 (D) 14

17. The shadow of a tower becomes 40 m longer when the Sun's altitude changes from 60° to 30°. The height of the tower is:

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

18. The probability that a non-leap year selected at random has 53 Fridays is:

(A) $\frac{1}{7}$ (B) $\frac{2}{7}$ (C) 0 (D) $\frac{6}{7}$

*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 quadrilateral with vertices $A(2, -2)$, $B(7, 3)$, $C(11, -1)$ and $D(6, -6)$, taken in order, is a rectangle.

Reason (R) : A parallelogram whose diagonals are equal is a rectangle.

20. *Assertion (A) :* The polynomial $x^2 + 4x + 5$ has no real zeroes.

Reason (R) : A quadratic polynomial $ax^2 + bx + c$ has no real zeroes if $b^2 - 4ac < 0$.

SECTION B

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

21. (a) If the HCF of 450 and 216 is expressible in the form $23m - 51$, find the value of m.

OR

(b) Find the least number which when divided by 12, 16 and 24 leaves remainder 7 in each case.

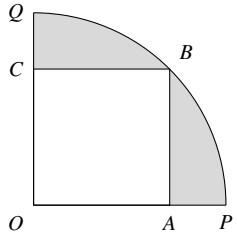
22. (a) The diagonals of a trapezium $ABCD$ with $AB \parallel DC$ intersect at O. If $OA = (3x - 19)$, $OC = (x - 5)$, $OB = (x - 3)$ and $OD = 3$ units, find the value(s) of x.

OR

(b) D, E and F are the mid-points of the sides BC, CA and AB of $\triangle ABC$. Prove that $\triangle DEF \sim \triangle ABC$.

23. If $4\cot^2 45^\circ - \sec^2 60^\circ + \sin^2 60^\circ + p = 4$, find the value of p.

24. In the given figure, a square $OABC$ is inscribed in a quadrant $OPBQ$. If $OA = 15$ cm, find the area of the shaded region. (Use $\pi = 3.14$)



25. Three coins are tossed together. Find the probability of getting (i) at most one head, (ii) exactly two heads.

SECTION C

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

26. Prove that $\sqrt{7}$ is an irrational number.

27. If α and β are the zeroes of the polynomial $3x^2 + 5x - 2$, find a quadratic polynomial whose zeroes are 2α and 2β.

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28. (a) How many terms of the A.P. $9, 17, 25, \ldots$ must be taken to give a sum of 636?

OR

(b) If the sum of the first 7 terms of an A.P. is 49 and that of its first 17 terms is 289, find the sum of its first n terms.

29. A $\triangle ABC$ is drawn to circumscribe a circle of radius 4 cm such that the segments BD and DC into which BC is divided by the point of contact D are 8 cm and 6 cm. If the area of $\triangle ABC$ is 84 cm^2, find AB and AC.

30. If $A(-2, -1)$, $B(a, 0)$, $C(4, b)$ and $D(1, 2)$ are the vertices of a parallelogram $ABCD$, find a and b. Hence find the length of AB.

31. (a) Prove that: $\dfrac{1+\cos\theta}{\sin\theta} + \dfrac{\sin\theta}{1+\cos\theta} = 2\operatorname{cosec}\theta$

OR

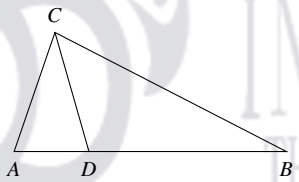
(b) If $1 + \sin^2\theta = 3\sin\theta\cos\theta$, prove that $\tan\theta = 1$ or $\dfrac{1}{2}$.

SECTION D

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

32. A train travels 180 km at a uniform speed. If the speed had been 9 km/h more, it would have taken 1 hour less for the same journey. Find the speed of the train and the time taken.

33. In the given figure, $\angle ADC = \angle BCA$, where D lies on AB. Prove that $\triangle ACB \sim \triangle ADC$. Hence find BD if $AC = 8$ cm and $AD = 3$ cm. Also show that $CA^2 = AB \cdot AD$.



34. (a) Fifty schools decided to share equally the cost of canvas for 1500 tents. Each tent has a cylindrical lower part of base radius 2.8 m and height 3.5 m, with a conical upper part of the same radius and height 2.1 m. If the canvas costs ₹ 120 per m^2, find the amount shared by each school.

OR

(b) A toy is in the form of a cylinder with a hemisphere at one end and a cone at the other. The radius and height of the cylinder are 5 cm and 13 cm, the radii of the hemisphere and cone equal that of the cylinder, and the total height of the toy is 30 cm. Find the total surface area of the toy.

35. (a) The angle of elevation of the top of a vertical tower from a point X on the ground is $60°$. From a point Y, 40 m vertically above X, the angle of elevation is $30°$. Find the height of the tower, the distance of X from the foot of the tower and from its top.

OR

(b) The angle of elevation of a jet fighter from a point A on the ground is $60°$. After a flight of 15 seconds, the angle of elevation changes to $30°$. If the jet is flying at 720 km/h, find the constant height at which it is flying. (Use $\sqrt{3} = 1.732$)

SECTION E

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

36. An interior designer hired two painters, Manan and Bhima, to make 50 paintings each. Manan asked ₹ 6000 for the first painting and an increment of ₹ 200 for each following painting. Bhima asked ₹ 4000 for the first painting and an increment of ₹ 400 for each following painting. Based on the above information, answer the following questions:

(i) How much money did Manan get for his 25^{th} painting? *1*

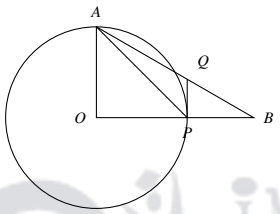
(ii) How much money did Bhima get in all? *1*

(iii) (a) Find the first painting for which Bhima gets more money than Manan. *2*

OR

(iii) (b) Another client got both painters to make the same number of paintings and paid each the same total amount. How many paintings did each make? *2*

37. In a discus throw, the athlete spins in a circle and the discus is released along a tangent to the circular orbit. In the figure, AB is a tangent to the circle of radius 75 cm with centre O; $\angle ABO = 30°$. OB meets the circle at P, and $PQ \parallel OA$ meets AB at Q. Based on the above information, answer the following questions:



(i) Find the length of AB. *1*

(ii) Find the length of OB. *1*

(iii) (a) Find the length of AP. *2*

OR

(iii) (b) Find the length of PQ. *2*

38. The marks of 50 students in a test are given below: Based on the above information, answer the following questions:

Marks	10–20	20–30	30–40	40–50	50–60	60–70	70–80
Students	4	8	10	12	10	4	2

(i) Write the modal class. *1*

(ii) Write the median class. *1*

(iii) (a) Find the mean marks. *2*

OR

(iii) (b) Find the mode. *2*

• • • End of Question Paper • • •

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