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/03

MATHEMATICS (STANDARD)

Class X • Sample Paper 03 • 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 the HCF of 85 and 153 is expressible in the form $85n - 153$, then the value of n is:

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

2. The zeroes of the polynomial $x^2 - 3x - m(m+3)$ are:

(A) $m,\ m+3$ (B) $-m,\ m+3$ (C) $m,\ -(m+3)$ (D) $-m,\ -(m+3)$

3. The values of x and y satisfying the equations $32x+33y=34$ and $33x+32y=31$ are respectively:

(A) $-1,\ 2$ (B) $-1,\ 4$ (C) $1,\ -2$ (D) $-1,\ -4$

4. The quadratic equation $x^2 - 4x + k = 0$ has distinct real roots if:

(A) $k=4$ (B) $k>4$ (C) $k=16$ (D) $k<4$

5. If $(k+2)$, $(4k-6)$ and $(3k-2)$ are three consecutive terms of an A.P., then the value of k is:

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

6. $\triangle ABC \sim \triangle QPR$. If $AC = 6$ cm, $BC = 5$ cm, $QR = 3$ cm and $PR = x$ cm, then the value of x is:

(A) 3.6 (B) 2.5 (C) 10 (D) 3.2

7. The distance between the points $(10\cos 30°, 0)$ and $(0, 10\cos 60°)$ is:

(A) 10 units (B) 100 units (C) 5 units (D) 20 units

8. If $\sin A + \sin^2 A = 1$, then the value of $\cos^2 A + \cos^4 A$ is:

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

9. A card is drawn at random from a box containing cards numbered 11 to 123. The probability that the number on the card is a perfect square is:

(A) $\frac{8}{113}$ (B) $\frac{7}{113}$ (C) $\frac{9}{113}$ (D) $\frac{10}{113}$

10. The perimeter of a sector of a circle of radius 14 cm and central angle 45° is:

(A) 11 cm (B) 22 cm (C) 28 cm (D) 39 cm

11. A solid sphere fits exactly inside a cubical box of side $2a$. The volume of the sphere is:

(A) $\frac{4}{3}\pi a^3$ (B) $\frac{32}{3}\pi a^3$ (C) $\frac{1}{6}\pi a^3$ (D) $\frac{2}{3}\pi a^3$

12. For the following distribution, the sum of the lower limits of the median class and the modal class is:

Class	0–5	5–10	10–15	15–20	20–25
Frequency	10	15	12	20	9

(A) 15 (B) 25 (C) 30 (D) 35

13. Two dice are thrown together. The probability that the sum of the numbers is a multiple of 4 is:

(A) $\frac{1}{4}$ (B) $\frac{1}{9}$ (C) $\frac{1}{3}$ (D) $\frac{1}{8}$

14. AD is a median of $\triangle ABC$ with vertices $A(5, -6)$, $B(6, 4)$ and $C(0, 0)$. The length of AD is:

(A) $2\sqrt{17}$ units (B) $2\sqrt{15}$ units (C) $\sqrt{101}$ units (D) 10 units

15. The minute hand of a clock is 84 cm long. The distance covered by its tip from 10:10 a.m. to 10:25 a.m. is:

(A) 44 cm (B) 88 cm (C) 132 cm (D) 176 cm

16. The upper limit of the modal class of the following distribution is:

Marks	less than 10	less than 20	less than 30	less than 40	less than 50	less than 60
Students	3	12	27	57	75	80

(A) 30 (B) 40 (C) 50 (D) 60

17. If a pole 6 m high casts a shadow $2\sqrt{3}$ m long on the ground, then the Sun's elevation is:

(A) 60° (B) 45° (C) 30° (D) 90°

18. Seven face cards are removed from a deck of 52 playing cards and the remaining cards are shuffled well. The probability of drawing a face card from them is:

(A) $\frac{1}{9}$ (B) $\frac{5}{52}$ (C) $\frac{7}{45}$ (D) $\frac{1}{5}$

*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 x-axis divides the line segment joining $A(1, -5)$ and $B(-4, 5)$ in the ratio $1 : 1$.

Reason (R) : The ratio in which the x-axis divides the join of (x_1, y_1) and (x_2, y_2) is $-y_1 : y_2$.

20. *Assertion (A) :* The equation $4x^2 - 12x + 9 = 0$ has repeated roots.

Reason (R) : A quadratic equation $ax^2 + bx + c = 0$ has repeated roots if its discriminant is greater than zero.

SECTION B

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

21. (a) 144 cartons of Coke cans and 90 cartons of Pepsi cans are to be stacked in a canteen. If each stack is of the same height and contains cartons of the same drink, find the greatest number of cartons each stack can have.

OR

(b) The LCM of two prime numbers p and q ($p > q$) is 221. Find the value of $3p - q$.

22. (a) A street light bulb is fixed on a pole 6 m above the street. A woman of height 1.5 m casts a shadow 3 m long. How far is she from the base of the pole?

OR

(b) Two sides and the perimeter of one triangle are respectively three times the corresponding two sides and the perimeter of another triangle. Are the two triangles similar? Justify.

23. If $x\cos 60^\circ + y\cos 0^\circ + \sin 30^\circ - \cot 45^\circ = 5$, find the value of $x + 2y$.

24. In a circle of radius 21 cm, an arc subtends an angle of 60° at the centre. Find the length of the arc and the area of the sector.

25. A box contains 90 discs numbered 1 to 90. One disc is drawn at random. Find the probability that it bears (i) a two-digit number, (ii) a perfect square number, (iii) a number divisible by 5.

SECTION C

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

26. Prove that $\sqrt{2}$ is an irrational number.

27. Find the zeroes of the polynomial $4\sqrt{3}x^2 + 5x - 2\sqrt{3}$ and verify the relationship between the zeroes and the coefficients.

28. (a) Find the middle term of the A.P. $7, 13, 19, \ldots, 247$ and the sum of all its terms.

OR

(b) Find the sum of all two-digit numbers which leave remainder 3 when divided by 7.

29. Two tangents TP and TQ are drawn to a circle with centre O from an external point T. Prove that $\angle PTQ = 2\angle OPQ$.

30. The points $A(6, 1)$, $B(8, 2)$, $C(9, 4)$ and $D(p, 3)$ are the vertices of a parallelogram taken in order. Find the value of p and the length of the diagonal AC.

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31. (a) Prove that: $(1+\cot A+\tan A)(\sin A-\cos A)=\dfrac{\sec A}{\operatorname{cosec}^2 A}-\dfrac{\operatorname{cosec} A}{\sec^2 A}$

OR

(b) Prove that: $\sqrt{\dfrac{1+\cos\theta}{1-\cos\theta}}+\sqrt{\dfrac{1-\cos\theta}{1+\cos\theta}}=2\operatorname{cosec}\theta$

SECTION D

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

32. In a stream running at 2 km/h, a motor boat goes 10 km upstream and back again to the starting point in 55 minutes. Find the speed of the motor boat in still water.

33. State and prove the Basic Proportionality Theorem. Using it, prove the following: In $\triangle ABC$, D and E are points on AB and AC such that $\dfrac{AD}{DB}=\dfrac{AE}{EC}$ and $\angle ADE=\angle AED$. Prove that $\triangle ABC$ is isosceles.

34. (a) A juice seller serves juice in glasses whose inner diameter is 5 cm, but the bottom of each glass has a hemispherical raised portion which reduces its capacity. If the height of a glass is 10 cm, find its apparent capacity and actual capacity. (Use $\pi=3.14$)

OR

(b) A decorative block is made of a cube of edge 5 cm with a hemisphere of diameter 4.2 cm fixed on its top. Find the total surface area of the block and its volume.

35. (a) As observed from the top of a 75 m high lighthouse, the angles of depression of two ships are 30° and 45°. If one ship is exactly behind the other on the same side of the lighthouse, find the distance between the ships. (Use $\sqrt{3}=1.732$)

OR

(b) A man on the top of a vertical tower observes a car moving at uniform speed directly towards the tower. It takes 12 minutes for the angle of depression to change from 30° to 45°. How soon after this will the car reach the tower? (Use $\sqrt{3}=1.732$)

SECTION E

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

36. Subba Rao joined a company in 1995. His annual salary (in ₹) in the n^{th} year is given by $200(29+n)$, i.e. he gets an increment of ₹ 200 every year. He worked in the company for 35 years. Based on the above information, answer the following questions:

(i) Write the first four terms of the A.P. of his annual salaries and its common difference. *1*

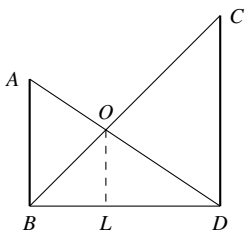
(ii) In which year of service does his salary become ₹ 9000? *1*

(iii) (a) Find the total salary he received in the 35 years. *2*

OR

(iii) (b) In which calendar year did his salary first exceed ₹ 12000? *2*

37. Two vertical poles AB and CD of heights x m and y m stand at B and D, z m apart. The lines AD and CB, joining the top of each pole to the foot of the other, meet at O. OL is perpendicular to BD with $OL=d$ m. Based on the above information, answer the following questions:



(i) Which similarity criterion shows $\triangle DOL\sim\triangle DAB$? *1*

(ii) If $x=4$ and $y=6$, find d. *1*

(iii) (a) Express BL in terms of y, z and d. *2*

OR

(iii) (b) Prove that $\frac{1}{x}+\frac{1}{y}=\frac{1}{d}$. *2*

38. A survey of the heights (in cm) of 50 girls of Class X gave the following data: Based on the above information, answer the following questions:

Height (cm)	120–130	130–140	140–150	150–160	160–170
No. of girls	2	8	12	20	8

(i) Write the modal class. *1*

(ii) Write the median class. *1*

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

OR

(iii) (b) Find the modal height. *2*

• • • End of Question Paper • • •

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