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/08

MATHEMATICS (STANDARD)

Class X • Sample Paper 08 • 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. A number of the form 8^n, where n is a natural number greater than 1, can never be divisible by:

(A) 2 (B) 40 (C) 64 (D) 2^n

2. If the sum of the zeroes of the polynomial $kx^2+4x+3k$ is equal to their product, then the value of $(-k)$ is:

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

3. The pair of linear equations $-3x+5y=7$ and $2px-3y=1$ represents intersecting lines for:

(A) all real p except $\frac{9}{10}$ (B) all real p except $-\frac{9}{10}$
(C) all real p except $\frac{10}{9}$ (D) all real values of p

4. If the discriminant of the quadratic equation $3x^2 - 2x + c = 0$ is 16, then the value of c is:

(A) 1 (B) 0 (C) -1 (D) $\sqrt{2}$

5. If the sum of the first n terms of an A.P. is $3n^2 + n$ and its common difference is 6, then its first term is:

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

6. The perimeters of two similar triangles ABC and PQR are 56 cm and 48 cm respectively. Then $\frac{AB}{PQ}$ is:

(A) $\frac{6}{7}$ (B) $\frac{7}{6}$ (C) $\frac{49}{36}$ (D) $\frac{8}{7}$

7. If the point (x, y) is equidistant from the points $(2, 1)$ and $(1, -2)$, then:

(A) $x + 3y = 0$ (B) $3x + y = 0$ (C) $x + 2y = 0$ (D) $3x + 2y = 0$

8. If $\alpha + \beta = 90^\circ$ and $\alpha = 2\beta$, then the value of $\cos^2\alpha + \sin^2\beta$ is:

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

9. In a family of 3 children, the probability of having at least one boy is:

(A) $\frac{7}{8}$ (B) $\frac{1}{8}$ (C) $\frac{5}{8}$ (D) $\frac{3}{8}$

10. The area swept by the 14 cm long minute hand of a clock in 5 minutes is:

(A) $\frac{154}{3}$ cm^2 (B) $\frac{77}{3}$ cm^2 (C) 154 cm^2 (D) $\frac{308}{3}$ cm^2

11. The volume of a right circular cone whose base area is 156 cm^2 and height is 8 cm is:

(A) 2496 cm^3 (B) 1248 cm^3 (C) 1664 cm^3 (D) 416 cm^3

12. The mean of 20 observations is 15. On checking, it was found that an observation 25 was misread as 35. The correct mean is:

(A) 14.5 (B) 15.5 (C) 14 (D) 15

13. A die is thrown once. The probability of getting an odd number or a multiple of 3 is:

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

14. The point P divides the line segment joining $A(4, -5)$ and $B(1, 2)$ in the ratio $5 : 2$. The coordinates of P are:

(A) $\left(\frac{13}{7}, 0\right)$ (B) $\left(\frac{5}{3}, 0\right)$ (C) $\left(\frac{13}{7}, -1\right)$ (D) $\left(0, \frac{13}{7}\right)$

15. If the radius of a circle is increased by 10%, its area increases by:

(A) 10% (B) 20% (C) 21% (D) 25%

16. If the median of the observations $\frac{x}{5}, \frac{x}{4}, \frac{x}{2}, x, \frac{x}{3}$ $(x > 0)$ is 8, then x is:

(A) 24 (B) 32 (C) 8 (D) 16

17. When the Sun's altitude increases from 30° to 60°, the length of the shadow of a 15 m high pole decreases by:

(A) $10\sqrt{3}$ m (B) $5\sqrt{3}$ m (C) 15 m (D) $20\sqrt{3}$ m

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18. A two-digit number is chosen at random. The probability that it is divisible by both 3 and 5 is:

(A) $\frac{1}{15}$ (B) $\frac{1}{9}$ (C) $\frac{2}{15}$ (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 points $(1,1)$, $(-1,-1)$ and $(-\sqrt{3},\sqrt{3})$ are the vertices of an equilateral triangle.

Reason (R) : A triangle whose three sides are equal is equilateral.

20. *Assertion (A) :* If the product of the zeroes of $x^2+3x+5k$ is -10, then $k=-2$.

Reason (R) : The sum of the zeroes of ax^2+bx+c is $-\frac{b}{a}$.

SECTION B

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

21. (a) Find the HCF and LCM of 6, 72 and 120 using prime factorisation.

OR

(b) Three bells toll at intervals of 9, 12 and 15 minutes. If they toll together at 8 a.m., at what time will they next toll together?

22. (a) In $\triangle PQR$, S and T are points on PQ and PR with $ST \parallel QR$. If $\frac{PS}{SQ}=\frac{3}{5}$ and $PR=28$ cm, find PT.

OR

(b) $\triangle ABC \sim \triangle DEF$ with $AB=4$ cm, $DE=6$ cm, $EF=9$ cm and $FD=12$ cm. Find the perimeter of $\triangle ABC$.

23. If $\sin\theta+\cos\theta=\sqrt{2}$, find the value of $(\sin\theta-\cos\theta)$.

24. Find the area of the sector of a circle of radius 6 cm whose central angle is 60°. Also find the area of the corresponding major sector.

25. Seventeen cards numbered $1,2,3,\ldots,17$ are put in a box. One card is drawn at random. Find the probability that the number on it is (i) a prime, (ii) odd.

SECTION C

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

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

27. If α and β are the zeroes of $2x^2-9x+5$, find the values of $\alpha^2+\beta^2$ and $\alpha^3+\beta^3$.

28. (a) During a festival, a sweet shop arranged 200 ladoos so that the bottom row has 20 ladoos, the next row 19, the next 18, and so on. How many rows are needed, and how many ladoos are in the top row?

OR

(b) The sum of the first n terms of an A.P. is $2n^2+3n$. Find its first term, common difference and 15^{th} term.

29. Prove that the parallelogram circumscribing a circle is a rhombus.

30. If the point $P(x, y)$ is equidistant from $A(a+b, b-a)$ and $B(a-b, a+b)$, prove that $bx = ay$.

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

OR

(b) If $\cos\theta+\sin\theta = 1$, prove that $\cos\theta-\sin\theta = \pm 1$.

SECTION D

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

32. Manu and Aiza compete in a 60 km cycling race. Aiza's average speed is 10 km/h more than Manu's and she finishes the race half an hour earlier. Find the time taken by Manu to finish the race and Aiza's speed.

33. State and prove the Basic Proportionality Theorem. Using it, solve: In $\triangle ABC$, $DE \parallel BC$ with D on AB and E on AC. If $AD = (7x-4)$ cm, $DB = (5x-2)$ cm, $AE = (3x+4)$ cm and $EC = (3x+2)$ cm, find x.

34. (a) A cone of maximum size is carved out from a cube of edge 14 cm. Find the curved surface area of the cone and the surface area of the remaining solid. (Use $\sqrt{5} = 2.236$)

OR

(b) A cone of the same height and base radius is carved out of a solid cylinder of height 24 cm and base radius 7 cm. Find the total surface area and the volume of the remaining solid.

35. (a) A radio tower is built in two sections, B (lower) and A (upper). From a point O on the ground 36 m from the base of the tower, the angle of elevation of the top of section B is 30° and that of the top of section A is 45°. Find the height of each section and the length of the wire from O to the top of section B.

OR

(b) Two trees stand on flat ground. From a point X on the ground, the angle of elevation of the tops of both trees is 60°. The horizontal distance of X from the smaller tree is 10 m and the distance between the tops of the trees is 30 m. Find the horizontal distance between the trees and the height of the bigger tree.

SECTION E

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

36. A metal worker has two alloys: one contains 42% iron and the other 28% iron. He wants to make 140 kg of a new alloy containing 35% iron. Let x kg and y kg of the first and second alloys be used. Based on the above information, answer the following questions:

(i) Form the equation for the total mass. *1*

(ii) Form the equation for the mass of iron. *1*

(iii) (a) Find x and y. *2*

OR

(iii) (b) How much of each alloy is needed for 140 kg of a 40% iron alloy? *2*

37. A triangular park ABC with $AB = AC$ surrounds a circular fountain that touches BC, CA and AB at P, R and Q respectively. Based on the above information, answer the following questions:

(i) Name the tangent segments from B that are equal. *1*

(ii) Prove that P bisects BC. *1*

(iii) (a) If $AB = AC = 13$ m and $BC = 10$ m, find AQ. *2*

OR

(iii) (b) If the perimeter of $\triangle ABC$ is 36 m and $AQ = 8$ m, find BC. *2*

38. The mean marks scored by 40 students in a test is 69.5. The distribution is given below: Based on the above information, answer the following questions:

Marks	45–55	55–65	65–75	75–85	85–95
Students	4	x	y	9	4

(i) Write the relation between x and y from the total. *1*

(ii) Write the relation between x and y from the mean. *1*

(iii) (a) Find x and y. *2*

OR

(iii) (b) Taking $x = 11$ and $y = 12$, find the mode. *2*

• • • End of Question Paper • • •

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