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/09

MATHEMATICS (STANDARD)

Class X • Sample Paper 09 • 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 LCM of two numbers is 2475 and their product is 12375, then their HCF is:

(A) 5 (B) 15 (C) 25 (D) 3

2. If α and β are the zeroes of $ax^2 - 5x + c$ and $\alpha + \beta = \alpha\beta = 10$, then the values of a and c are respectively:

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

3. The solution of the pair of equations $3^{x+y} = 81$ and $81^{x-y} = 3$ is:

(A) $x = \frac{17}{8}, y = \frac{15}{8}$ (B) $x = 2, y = 2$ (C) $x = \frac{15}{8}, y = \frac{17}{8}$ (D) $x = 2, y = 1$

4. If the quadratic equation $x^2 + 4x + k = 0$ has real and equal roots, then:

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

5. In an A.P., the 4^{th} term is 11 and the 10^{th} term is 23. The common difference is:

(A) 2 (B) 3 (C) 4 (D) 5

6. If $\triangle ABC \sim \triangle PQR$ with $\angle A = 32^\circ$ and $\angle R = 65^\circ$, then $\angle B$ is:

(A) 83° (B) 32° (C) 65° (D) 97°

7. The point on the x-axis which is equidistant from $(2, -5)$ and $(-2, 9)$ is:

(A) $(-7, 0)$ (B) $(7, 0)$ (C) $(0, -7)$ (D) $(0, 7)$

8. If $x \tan 45^\circ \cos 60^\circ = \sin 60^\circ \cot 60^\circ$, then x is:

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

9. Two dice are thrown at the same time. The probability of not getting a doublet is:

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

10. A car wiper blade of length 25 cm sweeps through an angle of 115°. The area cleaned in one sweep is:

(A) 627.48 cm^2 (B) 313.74 cm^2 (C) 1254.96 cm^2 (D) 501.20 cm^2

11. The ratio of the lateral surface area to the total surface area of a cylinder with base diameter 1.6 m and height 20 cm is:

(A) 1 : 7 (B) 1 : 5 (C) 7 : 1 (D) 5 : 1

12. The mean of the first 20 odd natural numbers is:

(A) 20 (B) 21 (C) 19 (D) 40

13. A coin is tossed two times. The probability of getting at most one head is:

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

14. $A(-3, 2)$, $B(-1, -4)$ and $C(5, 2)$ are the vertices of $\triangle ABC$. If P and Q are the mid-points of AB and AC, the length of PQ is:

(A) $3\sqrt{2}$ units (B) $6\sqrt{2}$ units (C) $\sqrt{2}$ units (D) $2\sqrt{3}$ units

15. The perimeter of a semicircular protractor of diameter 14 cm is:

(A) 36 cm (B) 22 cm (C) 44 cm (D) 50 cm

16. The observations 24, 25, 26, $x+2$, $x+3$, 30, 31, 34 are in ascending order. If their median is 27.5, then x is:

(A) 25 (B) 26 (C) 27 (D) 24

17. If the ratio of the length of a rod to its shadow is $1 : \sqrt{3}$, then the angle of elevation of the Sun is:

(A) 30° (B) 45° (C) 60° (D) 90°

18. A die is thrown once. The probability of getting a number lying between 2 and 6 is:

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

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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) :* The points $A(-1, 0)$, $B(3, 1)$, $C(2, 2)$ and $D(-2, 1)$, taken in order, form a parallelogram.

Reason (R) : The diagonals of a parallelogram bisect each other.

20. *Assertion (A) :* The quadratic equation $2x^2 - 6x + 3 = 0$ has real and distinct roots.

Reason (R) : A quadratic equation $ax^2 + bx + c = 0$ has two distinct real roots if $b^2 - 4ac > 0$.

SECTION B

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

21. (a) Find the greatest number which divides 285 and 1249 leaving remainders 9 and 7 respectively.

OR

(b) Find the smallest number which when increased by 17 is exactly divisible by both 520 and 468.

22. (a) In $\triangle ABC$, $AD \perp BC$ and $AD^2 = BD \cdot DC$. Prove that $\angle BAC = 90^\circ$.

OR

(b) A girl of height 1.6 m stands 3.2 m from a lamp-post and casts a shadow 4.8 m long. Find the height of the lamp-post.

23. If $\tan\theta = \dfrac{1}{\sqrt{7}}$, find the value of $\dfrac{\text{cosec}^2\theta - \sec^2\theta}{\text{cosec}^2\theta + \sec^2\theta}$.

24. A chord of a circle of radius 6 cm subtends an angle of 60° at the centre. Find the area of the minor segment. (Use $\pi = 3.14$, $\sqrt{3} = 1.73$)

25. A card is drawn at random from cards numbered 1 to 100. Find the probability that the number on it is a perfect square or a multiple of 9.

SECTION C

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

26. Given that $\sqrt{3}$ is irrational, prove that $2\sqrt{3} - 1$ is an irrational number.

27. The zeroes of $x^2 + px + q$ are double the zeroes of $2x^2 - 5x - 3$. Find the values of p and q.

28. (a) The sum of the 4^{th} and 8^{th} terms of an A.P. is 24 and the sum of the 6^{th} and 10^{th} terms is 44. Find the first three terms.

OR

(b) A sum of ₹ 700 is to be used to give seven cash prizes, each prize being ₹ 20 less than its preceding prize. Find the value of each prize.

29. A quadrilateral $ABCD$ is drawn to circumscribe a circle. Prove that $AB + CD = BC + DA$.

30. Find the ratio in which the point $P(4, m)$ divides the line segment joining $A(2, 3)$ and $B(6, -3)$. Hence find m.

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31. (a) Prove that: $\sin^8\theta - \cos^8\theta = (\sin^2\theta - \cos^2\theta)(1 - 2\sin^2\theta\cos^2\theta)$

OR

(b) If $a\cot\theta + b\operatorname{cosec}\theta = p$ and $b\cot\theta + a\operatorname{cosec}\theta = q$, prove that $p^2 - q^2 = b^2 - a^2$.

SECTION D

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

32. The difference of the squares of two natural numbers is 45. The square of the smaller number is four times the larger number. Find the numbers.

33. CD and GH are respectively the bisectors of $\angle ACB$ and $\angle EGF$, with D on AB and H on FE of $\triangle ABC$ and $\triangle FEG$. If $\triangle ABC \sim \triangle FEG$, prove that (i) $\dfrac{CD}{GH} = \dfrac{AC}{FG}$, (ii) $\triangle DCB \sim \triangle HGE$, (iii) $\triangle DCA \sim \triangle HGF$.

34. (a) A Durga Puja tent has an open cuboidal lower part on a rectangular base 50 m × 21 m, surmounted by a semi-cylindrical roof (with semicircular ends of diameter 21 m). The total height of the tent is 19 m. Find the canvas required and its cost at ₹ 24 per m^2 (the base is not covered).

OR

(b) A metallic silo is a cylinder of radius 1.5 m and height 7 m surmounted by a cone of the same radius and height 2 m. Find the area of metal sheet used for the curved surfaces and the volume of grain it can store. (Use $\pi = 3.14$)

35. (a) From the top of a 60 m high building, the angles of depression of the top and the bottom of a tower are 30° and 60°. Find the height of the tower and the distance between the building and the tower.

OR

(b) From a point on the ground, the angles of elevation of the bottom and the top of a transmission tower fixed on the top of a 20 m high building are 45° and 60°. Find the height of the tower. (Use $\sqrt{3} = 1.732$)

SECTION E

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

36. The ratio of the monthly incomes of Balu and Akhil is 9 : 7 and the ratio of their monthly expenditures is 4 : 3. Each of them saves ₹ 2000 per month. Let their incomes be $9x$, $7x$ and expenditures $4y$, $3y$. Based on the above information, answer the following questions:

(i) Form a linear equation for Balu's savings. *1*

(ii) Form a linear equation for Akhil's savings. *1*

(iii) (a) Find their monthly incomes. *2*

OR

(iii) (b) Find their monthly expenditures. *2*

37. A circular fountain touches the side DF of a triangular garden DEF at H, and the sides ED and EF produced at K and M respectively. $EK = 9$ m. Based on the above information, answer the following questions:

(i) Name the tangent segment from D equal to DH. *1*

(ii) Why is $EK = EM$? *1*

(iii) (a) Find the perimeter of $\triangle EDF$. *2*

OR

(iii) (b) If $DH = 3$ m and $FH = 4$ m, find ED and EF. *2*

38. A survey of 1000 schools was done on the number of computers they have: One school is chosen at random. Based on the above information, answer the following questions:

Computers	1–10	11–20	21–50	51–100	more than 100
Schools	250	200	290	20	240

(i) Find the probability that it has more than 100 computers. *1*

(ii) Find the probability that it has 50 or fewer computers. *1*

(iii) (a) Find the probability that it has no more than 20 computers, and that it has more than 20 but at most 100 computers. *2*

OR

(iii) (b) Find the probability that it has at least 11 computers, and that it does not have 21 to 50 computers. *2*

• • • End of Question Paper • • •

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