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/11

MATHEMATICS (STANDARD)

Class X • Sample Paper 11 • 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. For every natural number n, the number $n^2 + n$ is always:

(A) even (B) odd

(C) prime (D) a multiple of 3

2. If one zero of the polynomial $2x^2 - 3x + k$ is the reciprocal of the other, then the value of k is:

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

3. The solution of the pair of equations $2x + y + 1 = 0$ and $2x - 3y + 8 = 0$ is:

(A) $x = -\frac{11}{8},\ y = \frac{7}{4}$ (B) $x = \frac{11}{8},\ y = -\frac{7}{4}$ (C) $x = -\frac{7}{4},\ y = \frac{11}{8}$ (D) $x = 1,\ y = 2$

4. The values of k for which the quadratic equation $(3k+1)x^2+2(k+1)x+1=0$ has equal roots are:

(A) 0 only (B) 1 only (C) 0 or 1 (D) -1

5. The sum of the first 200 natural numbers is:

(A) 2010 (B) 2000 (C) 20100 (D) 21000

6. In $\triangle ABC$, $DE \parallel BC$ with D on AB and E on AC. If $AD = 1.5$ cm, $BD = 3$ cm and $AE = 1$ cm, then EC is:

(A) 2 cm (B) 1 cm (C) 4.5 cm (D) 3 cm

7. If $\left(\frac{a}{3}, 4\right)$ is the mid-point of the line segment joining $(-6, 5)$ and $(-2, 3)$, then the value of a is:

(A) -12 (B) -4 (C) 12 (D) -6

8. The value of $(1+\tan^2 A)(1+\sin A)(1-\sin A)$ is:

(A) $\sec^2 A$ (B) 1 (C) 0 (D) 2

9. A card is drawn at random from cards numbered 1 to 50. The probability that the number is divisible by both 2 and 3 is:

(A) $\frac{4}{25}$ (B) $\frac{8}{25}$ (C) $\frac{1}{5}$ (D) $\frac{3}{25}$

10. The radius of a circle whose area is equal to the sum of the areas of two circles of radii 6 cm and 8 cm is:

(A) 10 cm (B) 14 cm (C) 12 cm (D) 7 cm

11. The volume of the largest right circular cone that can be cut out of a cube of edge 4.2 cm is:

(A) 19.404 cm^3 (B) 58.212 cm^3 (C) 9.702 cm^3 (D) 38.808 cm^3

12. The mean of five numbers is 18. If one number is excluded, the mean of the remaining numbers becomes 16. The excluded number is:

(A) 26 (B) 23 (C) 18 (D) 20

13. Two dice are thrown at the same time. The probability of getting a doublet is:

(A) $\frac{1}{6}$ (B) $\frac{1}{36}$ (C) $\frac{5}{36}$ (D) $\frac{1}{12}$

14. The coordinates of the point which divides the join of $A(-1, 7)$ and $B(4, -3)$ in the ratio $2:3$ are:

(A) $(1, 3)$ (B) $(2, 3)$ (C) $(1, 2)$ (D) $(3, 1)$

15. The diameter of a wheel is 1.26 m. The distance travelled by it in 500 revolutions is:

(A) 1980 m (B) 990 m (C) 3960 m (D) 2970 m

16. If the mean of a data is 26 and its median is 25, then using the empirical relation its mode is:

(A) 23 (B) 24 (C) 27 (D) 22

17. A tower 30 m high casts a shadow $10\sqrt{3}$ m long on the ground. The angle of elevation of the Sun is:

(A) 30° (B) 45° (C) 60° (D) 90°

18. A box contains 12 balls, of which x are black. If 6 more black balls are added, the probability of drawing a black ball becomes double the earlier probability. The value of x is:

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

*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 point on the y-axis which is equidistant from $(-5, 2)$ and $(3, -2)$ is $(0, -2)$.
Reason (R) : Every point on the y-axis has its abscissa equal to zero.

20. *Assertion (A) :* The quadratic equation $3x^2 - 4\sqrt{3}x + 4 = 0$ has two equal real roots.
Reason (R) : A quadratic equation $ax^2 + bx + c = 0$ has two equal 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 HCF and LCM of 70 and 40 by prime factorisation and verify that HCF $\times$ LCM = product of the numbers.

OR

(b) A sweet seller has 420 kaju barfis and 130 badam barfis. He wants to stack them so that each stack has the same number of barfis of one kind only. Find the least number of stacks.

22. (a) $\triangle ABC$ and $\triangle AMP$ are right-angled at B and M respectively. Prove that $\triangle ABC \sim \triangle AMP$ and $\dfrac{CA}{PA} = \dfrac{BC}{MP}$.

OR

(b) The diagonals of a quadrilateral $ABCD$ intersect at O such that $\dfrac{AO}{BO} = \dfrac{CO}{DO}$. Show that $ABCD$ is a trapezium.

23. Evaluate: $\dfrac{5\cos^2 60^\circ + 4\sec^2 30^\circ - \tan^2 45^\circ}{\sin^2 30^\circ + \cos^2 30^\circ}$

24. An umbrella has 8 ribs which are equally spaced. Assuming the umbrella to be a flat circle of radius 45 cm, find the area between two consecutive ribs.

25. A jar contains 24 marbles, some green and the others blue. If the probability of drawing a green marble is $\dfrac{2}{3}$, find the number of blue marbles. Also find the probability of drawing a blue marble.

SECTION C

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

26. Given that $\sqrt{2}$ is irrational, prove that $\dfrac{5 - 3\sqrt{2}}{7}$ is an irrational number.

27. If α and β are the zeroes of the polynomial $x^2 + 7x + 12$, find the value of $\dfrac{1}{\alpha} + \dfrac{1}{\beta} - 2\alpha\beta$.

28. (a) How many terms of the A.P. $24, 21, 18, \ldots$ must be taken so that their sum is 78? Explain the double answer.

OR

(b) Find the sum of all odd numbers between 0 and 50, and the number of such terms.

29. XY and $X'Y'$ are two parallel tangents to a circle with centre O, and another tangent AB with point of contact C meets XY at A and $X'Y'$ at B. Prove that $\angle AOB = 90^\circ$.

30. Find the values of y for which the distance between $P(2, -3)$ and $Q(10, y)$ is 10 units. Also find the mid-point of PQ in each case.

31. (a) Prove that: $\tan^2 A - \tan^2 B = \dfrac{\sin^2 A - \sin^2 B}{\cos^2 A \cos^2 B}$

OR

(b) If $x = a\sec\theta + b\tan\theta$ and $y = a\tan\theta + b\sec\theta$, prove that $x^2 - y^2 = a^2 - b^2$.

SECTION D

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

32. The denominator of a fraction exceeds its numerator by 3. When 1 is added to both the numerator and the denominator, the new fraction exceeds the original fraction by $\frac{1}{24}$. Find the original and the new fractions.

33. State and prove the Basic Proportionality Theorem. Using it, prove the following: In $\triangle ABC$, D is on AB and E on AC with $DE \parallel BC$; F is on AD with $EF \parallel CD$. Prove that $AD^2 = AB \times AF$.

34. (a) A gulab jamun contains sugar syrup up to about 30% of its volume. Each gulab jamun is shaped like a cylinder with two hemispherical ends, of total length 5 cm and diameter 2.8 cm. Find approximately how much syrup is in 45 gulab jamuns.

OR

(b) A pen stand made of wood is a cuboid 15 cm $\times$ 10 cm $\times$ 3.5 cm with four conical depressions, each of radius 0.5 cm and depth 1.4 cm, to hold pens. Find the volume of wood in the stand.

35. (a) Two poles of equal heights stand opposite each other on either side of a road 80 m wide. From a point between them on the road, the angles of elevation of their tops are 60° and 30°. Find the height of the poles and the distances of the point from the poles.

OR

(b) A statue 1.6 m tall stands on the top of a pedestal. From a point on the ground, the angle of elevation of the top of the statue is 60° and that of the top of the pedestal is 45°. Find the height of the pedestal.

SECTION E

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

36. Rohan builds a house of cards by stacking cards in the shape of a pyramid. The top layer uses 3 cards and each layer below uses 3 more cards than the layer above it. Based on the above information, answer the following questions:

(i) If the bottom layer has 18 cards, write the A.P. of the number of cards per layer from the top, and its common difference. *1*

(ii) How many layers will a pyramid with 15 cards in the top layer and 138 cards in the bottom layer have? *1*

(iii) (a) Rohan has 360 cards. Find the maximum number of layers he can make starting with 3 cards at the top. *2*

OR

(iii) (b) How many cards are in the bottom layer of a 15-layer pyramid, and how many cards does it use in all? *2*

37. A circular stadium has its centre at O and radius 7 m. A camera is placed at a point P outside the stadium such that $OP = 25$ m. PA and PB are tangents to the boundary at A and B. Based on the above information, answer the following questions:

(i) Why is $OA \perp PA$? *1*

(ii) Find the length of the tangent PA. *1*

(iii) (a) Find the area of the quadrilateral *PAOB*. *2*

OR

(iii) (b) Find the length of the chord *AB*. *2*

38. 100 surnames were randomly picked from a telephone directory and the number of letters in them was recorded: Based on the above information, answer the following questions:

Number of letters	1–4	4–7	7–10	10–13	13–16	16–19
Surnames	6	30	40	16	4	4

(i) Write the modal class. *1*

(ii) Write the median class. *1*

(iii) (a) Find the median number of letters. *2*

OR

(iii) (b) Find the mean number of letters. *2*

• • • End of Question Paper • • •

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