**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/02**

# MATHEMATICS (STANDARD)

**Class X • Sample Paper 02 • 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.** The greatest number which divides 70 and 125, leaving remainders 5 and 8 respectively, is:

(A) 13 (B) 65 (C) 875 (D) 1750

**2.** If 2 is a zero of both the polynomials $3x^2 - px + 2$ and $4x^2 - qx - 10$, then the value of $2p - 3q$ is:

(A) 8 (B) 7 (C) 5 (D) 6

**3.** The value of $k$ for which the pair of equations $kx + 3y = k - 3$ and $12x + ky = 6$ has no solution is:

(A) 6 only (B) $-6$ only (C) 6 or $-6$ (D) 0 only

**4.** The values of $k$ for which the quadratic equation $2x^2 - kx + k = 0$ has equal roots are:

(A) 0 only (B) 4 only (C) 8 only (D) 0 and 8

**5.** If $(n-2)$, $(4n-1)$ and $(5n+2)$ are three consecutive terms of an A.P., then the value of $n$ is:

(A) 1 (B) 5 (C) 10 (D) 0

**6.** In $\triangle PQR$, $S$ and $T$ are points on $PQ$ and $PR$ such that $ST \parallel QR$. If $\frac{PS}{SQ} = \frac{3}{4}$ and $PR = 6.3$ cm, then $TR$ is:

(A) 2.7 cm (B) 3.6 cm (C) 9 cm (D) 4.5 cm

**7.** The point $P$ which divides the line segment joining $A(2, -5)$ and $B(5, 2)$ in the ratio $2:3$ lies in the:

(A) I quadrant (B) II quadrant (C) III quadrant (D) IV quadrant

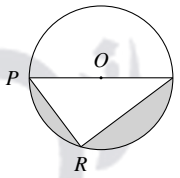
**8.** The value of $(1+\tan\theta+\sec\theta)(1+\cot\theta-\operatorname{cosec}\theta)$ is:

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

**9.** Two dice are thrown together. The probability that the sum of the numbers on them is a prime number is:

(A) $\frac{1}{2}$ (B) $\frac{5}{12}$ (C) $\frac{7}{18}$ (D) $\frac{1}{3}$

**10.** In the given figure, $O$ is the centre of the circle, $PQ$ is a diameter, $PR = 8$ cm, $QR = 6$ cm and $\angle PRQ = 90^\circ$. The area of the shaded region is:




(A) $\left(\frac{25\pi}{4} - 24\right)$ cm$^2$ (B) $\left(\frac{25\pi}{2} - 24\right)$ cm$^2$ (C) $\frac{25\pi}{4}$ cm$^2$ (D) $\frac{25\pi}{2}$ cm$^2$

**11.** The area of the base of a right circular cone is 51 cm$^2$ and its volume is 85 cm$^3$. The height of the cone is:

(A) $\frac{5}{3}$ cm (B) $\frac{5}{2}$ cm (C) 5 cm (D) 15 cm

**12.** If the mean of the observations $x,\ x+3,\ x+5,\ x+7$ and $x+10$ is 9, then the mean of the last three observations is:

(A) $10\frac{1}{3}$ (B) $10\frac{2}{3}$ (C) $11\frac{1}{3}$ (D) $11\frac{2}{3}$

**13.** A letter of the English alphabet is chosen at random. The probability that it is a letter of the word MATHEMATICS is:

(A) $\frac{4}{13}$ (B) $\frac{11}{26}$ (C) $\frac{5}{13}$ (D) $\frac{9}{26}$

**14.** The perimeter of the triangle formed by the points $(0, 0)$, $(1, 0)$ and $(0, 1)$ is:

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

**15.** If the area of a sector of a circle of radius 36 cm is $54\pi$ cm$^2$, then the length of the corresponding arc is:

(A) $8\pi$ cm (B) $6\pi$ cm (C) $4\pi$ cm (D) $3\pi$ cm

**16.** The mean and median of a data are 20 and 22 respectively. The mode of the data is:

(A) 20 (B) 26 (C) 22 (D) 21

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**17.** The angles of elevation of the top of a tower from two points on the ground at distances 4 m and 9 m from its base, in the same straight line, are complementary. The height of the tower is:

(A) 6 m (B) 13 m (C) 36 m (D) 5 m

**18.** One card is lost from a pack of 52 playing cards. If the lost card is a black card, the probability that a card drawn at random from the remaining cards is the queen of hearts is:

(A) $\frac{1}{52}$ (B) $\frac{1}{51}$ (C) $\frac{1}{26}$ (D) $\frac{2}{51}$

*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 fourth vertex $D$ of the parallelogram $ABCD$ with $A(-2, 3)$, $B(6, 7)$ and $C(8, 3)$ is $(0, -1)$.
*Reason (R) :* The diagonals of a parallelogram bisect each other.

**20.** *Assertion (A) :* If the zeroes of the quadratic polynomial $ax^2 + bx + c$, where $c \neq 0$, are equal, then $c$ and $a$ have the same sign.
*Reason (R) :* A quadratic polynomial whose zeroes are $\alpha$ and $\beta$ is $k[x^2 + (\alpha + \beta)x + \alpha\beta]$.

## SECTION B

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

**21.** (a) The HCF of 85 and 238 is expressible in the form $85m - 238$. Find the value of $m$.

**OR**

(b) Two numbers are in the ratio 2 : 3 and their LCM is 180. Find the numbers and their HCF.

**22.** (a) $\triangle ABC \sim \triangle PQR$ in which $AB = 6$ cm, $BC = 4$ cm, $AC = 8$ cm and $PR = 6$ cm. Find $(PQ + QR)$.

**OR**

(b) In $\triangle KMN$, $P$ and $Q$ lie on $KM$ and $KN$ such that $PQ \parallel MN$. If $\frac{KP}{PM} = \frac{4}{13}$ and $KN = 20.4$ cm, find $KQ$.

**23.** Evaluate in the simplest form: $\frac{\cos 45^\circ}{\sec 30^\circ + \operatorname{cosec} 30^\circ}$

**24.** The hour hand of a clock is 10 cm long. Find the area of the minor sector swept by it from 5 a.m. to 8 a.m. Also find the area of the corresponding major sector.

**25.** How many three-digit positive integers have hundreds digit 8 and units digit 5? Find the probability of selecting one such number from all three-digit numbers.

## SECTION C

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

**26.** Prove that $\sqrt{5}$ is an irrational number.

**27.** If $\alpha$ and $\beta$ are the zeroes of $ax^2 + bx + c$, prove that $\frac{\alpha}{\beta} + \frac{\beta}{\alpha} = \frac{b^2 - 2ac}{ac}$.

**28.** (a) The sum of three consecutive terms of an A.P. is 24 and the sum of their squares is 194. Find the terms.

**OR**

(b) The sum of the first $n$ terms of an A.P. is $S_n = 5n^2 + 3n$. If its $m^{\text{th}}$ term is 168, find $m$. Also find the $20^{\text{th}}$ term.

**29.** $PQ$ is a chord of length 8 cm of a circle of radius 5 cm. The tangents at $P$ and $Q$ intersect at $T$. Find the length $TP$.

**30.** In what ratio is the line segment joining $(3, -5)$ and $(-1, 6)$ divided by the line $y = x$? Also find the point of intersection.

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

**OR**

(b) If $\sin\theta + \cos\theta = \sqrt{2}$, prove that $\tan\theta + \cot\theta = 2$.

## SECTION D

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

**32.** A shopkeeper buys a number of books for ₹ 1800. If he had bought 15 more books for the same amount, each book would have cost him ₹ 20 less. Find the number of books he bought and the cost of each book.

**33.** State and prove the Basic Proportionality Theorem. Using it, prove the following: In $\triangle ABC$, $E$ is a point on $BC$ and $D$ is a point on $AB$ such that $DE \parallel AC$; $F$ is a point on $BE$ such that $DF \parallel AE$. Prove that $\dfrac{BF}{FE} = \dfrac{BE}{EC}$.

**34.** (a) Fermentation tanks are in the form of a cylinder mounted on a cone. The total height of the tank is 3.3 m and the height of the conical part is 1.2 m. The diameter of each part is 1 m. Find the capacity of the tank. If the level of liquid is 0.7 m from the top, find the surface area of the tank in contact with the liquid.

**OR**

(b) A model is shaped like a cylinder with two cones attached at its ends. The diameter of the model is 3 cm and its total length is 12 cm. If each cone has a height of 2 cm, find the volume of air in the model and the area of the sheet used.

**35.** (a) The angle of elevation of a cloud from a point 10 m above a lake is $30^\circ$ and the angle of depression of its reflection in the lake is $60^\circ$. Find the height of the cloud above the lake and its distance from the point of observation.

**OR**

(b) An electrician has to repair a fault on a pole 5 m high, at a point 1.3 m below its top. Find the length of the ladder he should use when it is inclined at $60^\circ$ to the horizontal, and how far from the foot of the pole he should place it. If instead he uses a ladder 7.4 m long, at what angle to the horizontal must it be placed? (Use $\sqrt{3} = 1.73$)

## SECTION E

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

**36.** Pinky scored 40 marks in a test, getting 3 marks for each right answer and losing 1 mark for each wrong answer. Had 4 marks been awarded for each correct answer and 2 marks deducted for each wrong answer, she would again have scored 40 marks. (She attempted every question.) Based on the above information, answer the following questions:

(i) Form a linear equation for the first scheme, taking $x$ right and $y$ wrong answers. *1*

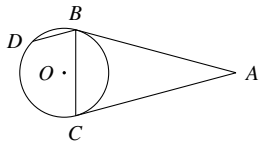
(ii) Form a linear equation for the second scheme. *1*

(iii) (a) How many questions were there in the test? *2*

**OR**

(iii) (b) What would she score if 5 marks were given for each right answer and 2 deducted for each wrong one? *2*

**37.** A circular pond in a park has its centre at $O$. From a point $A$, two straight paths $AB$ and $AC$ touch the pond at $B$ and $C$, with $\angle BAC = 30°$. A straight bridge $BD$ is built across the pond parallel to the path $AC$. Based on the above information, answer the following questions:




(i) What is the measure of $\angle OBA$? Give reason. *1*

(ii) Find the measure of $\angle ABC$. *1*

(iii) (a) Find the measure of $\angle DBC$. *2*

**OR**

(iii) (b) Find $\angle BOC$ and $\angle BDC$. *2*

**38.** The monthly consumption of electricity of 68 consumers of a locality is given below: Based on the above information, answer the following questions:

| **Units** | 65–85 | 85–105 | 105–125 | 125–145 | 145–165 | 165–185 | 185–205 |
|---|---|---|---|---|---|---|---|
| **Consumers** | 4 | 5 | 13 | 20 | 14 | 8 | 4 |

(i) Write the modal class. *1*

(ii) Write the median class. *1*

(iii) (a) Find the median monthly consumption. *2*

**OR**

(iii) (b) Find the modal monthly consumption. *2*

**• • • End of Question Paper • • •**

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