TERM-I EXAMINATION (2026–2027)

SUBJECT – MATHEMATICS STD – X

Time: 03:00 Hours **M.M.:** 80

Instructions:

1. All questions are compulsory.
2. The question paper has 5 Sections – A, B, C, D and E.
3. Section A has 20 MCQs carrying 1 mark each.
4. Section B has 5 questions carrying 2 marks each.
5. Section C has 6 questions carrying 3 marks each.
6. Section D has 4 questions carrying 5 marks each.
7. Section E has 3 case-based integrated questions carrying 4 marks each.
8. Use of calculator is not permitted. Draw neat figures wherever required.

SECTION A

Choose the correct option. (20 × 1 = 20)

Q.1 The exponent of 2 in the prime factorisation of 288 is:
(a) 3 (b) 4 (c) 5 (d) 6

Q.2 The zeroes of the quadratic polynomial $x^2 - 7x + 10$ are:
(a) both positive (b) both negative (c) one positive and one negative (d) equal

Q.3 The sum of the squares of three consecutive positive integers is 149. The integers are:
(a) 5, 6, 7 (b) 6, 7, 8 (c) 7, 8, 9 (d) 8, 9, 10

Q.4 The value of $\sin 45° \cos 45° + \cos 45° \sin 45°$ is:
(a) 0 (b) 1/2 (c) 1 (d) $\sqrt{2}$

Q.5 If P(E) denotes the probability of an event E, then:
(a) $P(E) < 0$ (b) $P(E) > 1$ (c) $0 \le P(E) \le 1$ (d) $-1 \le P(E) \le 1$

Q.6 A vertical pole and its shadow have equal lengths. The angle of elevation of the sun is:
(a) 30° (b) 45° (c) 60° (d) 90°

SECTION A — CONTINUED

Q.7 The probability of losing a game is 0.35. The probability of winning the game is:
(a) 0.35 (b) 0.65 (c) 0.75 (d) 0.85

Q.8 The points (2, 3), (2, –3), (–2, –3) and (–2, 3) are vertices of a:
(a) rectangle only (b) square (c) rhombus only (d) trapezium

Q.9 A 10 m ladder makes an angle of 60° with the ground while leaning against a wall. Its foot is:
(a) 5 m from the wall (b) $5\sqrt{3}$ m from the wall (c) $10\sqrt{3}$ m from the wall (d) 20 m from the wall

Q.10 A common root of $x^2 - 5x + 6 = 0$ and $x^2 - 3x + 2 = 0$ is:
(a) 1 (b) 2 (c) 3 (d) 4

Q.11 For the pair $2x + 3y = 7$ and $4x + ky = 14$ to represent coincident lines, k must be:
(a) 3 (b) 4 (c) 6 (d) 7

Q.12 $(\sec A + \tan A)(\sec A - \tan A)$ is equal to:
(a) 0 (b) 1 (c) sec A (d) tan A

Q.13 The distance between (x, 2) and (1, 6) is 5. The possible value(s) of x are:
(a) 4 only (b) –2 only (c) 4 or –2 (d) 2 or –4

Q.14 The pair of equations $x + 2y = 5$ and $3x + 6y = 12$ has:
(a) a unique solution (b) exactly two solutions (c) infinitely many solutions (d) no solution

Q.15 The equation $(x - 3)(x + 2) = x^2 - x - 6$ is:
(a) a linear equation (b) a quadratic equation (c) an identity (d) a cubic equation

Q.16 The HCF of 252 and 105 is:
(a) 7 (b) 14 (c) 21 (d) 28

Q.17 If P(E) = 0.72, then P(not E) is:
(a) 0.18 (b) 0.28 (c) 0.32 (d) 0.72

Q.18 The midpoint of the line segment joining (–4, 6) and (8, –2) is:
(a) (2, 2) (b) (4, 2) (c) (2, 4) (d) (–2, 2)

SECTION A — CONTINUED

Q.19 Assertion (A): The quadratic equation $x^2 - 10x + 25 = 0$ has equal and real roots.
Reason (R): A quadratic equation $ax^2 + bx + c = 0$ has equal roots when its discriminant is zero.
(a) Both A and R are true, and R is the correct explanation of A.
(b) Both A and R are true, but R is not the correct explanation of A.
(c) A is true, but R is false.
(d) A is false, but R is true.

Q.20 Assertion (A): If A is acute, then sec A increases as A increases.
Reason (R): cos A decreases as A increases in the interval $0° < A < 90°$.
(a) Both A and R are true, and R is the correct explanation of A.
(b) Both A and R are true, but R is not the correct explanation of A.
(c) A is true, but R is false.
(d) A is false, but R is true.

SECTION B

Short Answer Type-I Questions (5 × 2 = 10)

Q.21 Find the values of y for which the distance between A(–1, 4) and B(7, y) is 10 units.
OR
Find the area of the quadrilateral whose vertices, taken in order, are (1, 1), (5, 4), (3, –2) and (–1, –1).

Q.22 Find the zeroes of the polynomial $2x^2 - 5x - 3$ and verify the relationship between the zeroes and the coefficients.

Q.23 Solve the pair of linear equations: $2x + y = 11$ and $x - y = 1$.

Q.24 Prove that $\sqrt{7}$ is irrational.

Q.25 In ΔPQR, $\angle Q = 90°$, PQ = 9 cm and PR = 15 cm. Find sin P, cos P and tan P.
OR
If $\sin(A - B) = 1/2$ and $\cos(A + B) = 1/2$, where $0° < A + B \leq 90°$ and $A > B$, find A and B.

SECTION C

Short Answer Type-II Questions (6 × 3 = 18)

Q.26 Find the largest number which divides 437 and 705 leaving remainders 5 and 3 respectively.

Q.27 Solve the following quadratic equation using the quadratic formula:
$2x^2 – 5x – 3 = 0$
OR
Find the value of k for which the equation $kx^2 – 6x + 2 = 0$ has equal roots.

Q.28 The sum of the digits of a two-digit number is 11. When the digits are interchanged, the resulting number is 27 greater than the original number. Find the number.
OR
The ratio of the incomes of two persons is 4 : 5 and the ratio of their expenditures is 3 : 4. If each person saves ■2,000 per month, find their monthly incomes.

Q.29 Prove the identity:

$(1 + \sin A) / \cos A = \sec A + \tan A$

Q.30 A point R divides the line segment joining A(–5, 2) and B(7, 8) internally in the ratio AR : RB = 2 : 1. Find the coordinates of R.

Q.31 Two dice, one red and one blue, are thrown simultaneously. Find the probability that the sum of the numbers appearing on the dice is:
(i) 8 (ii) 10 (iii) greater than 9.

SECTION D

Long Answer Type Questions (4 × 5 = 20)

Q.32 From the top of a 24 m high building, the angles of depression of the top and foot of a vertical pole are 30° and 60° respectively. Find the height of the pole.
OR
A man observes a car approaching a tower at an angle of depression of 30°. After 8 seconds, the angle of depression becomes 60°. If the car moves at 5 m/s, find the height of the tower.

Q.33 Prove that:

$(\cos A + \sin A – 1) / (\cos A + \sin A + 1) = (\tan A – \sec A) / (\tan A + \sec A)$
OR
If $\sin \theta + \cos \theta = p$ and $\sec \theta + \operatorname{cosec} \theta = q$, prove that $q(p^2 – 1) = 2p$.

Q.34 The altitude of a right triangle is 7 cm less than its base. If the hypotenuse is 13 cm, find the other two sides.

Q.35 Draw the graphs of the equations $x + 2y = 8$ and $2x – y = 1$.
(i) Find their point of intersection.
(ii) Find the coordinates of the points where each line meets the coordinate axes.
(iii) Using the graph, identify the triangular region bounded by the two lines and the y-axis.
(iv) Find the area of this triangular region.

SECTION E

Case-Based Integrated Questions (3 × 4 = 12)

Q.36 A kite is flying at a point A. From the hand of a student at C, the angle of elevation of the kite is 45°. The student is standing 30 m horizontally from the point D directly below the kite. Another kite is flying at point B, and its angle of elevation from C is 60°. The vertical height of B above the ground is 30 m.

A B

■ ■

D ■■■■■■■■■■■■■■■■■■ C ■■■■■■■■■■■■■■ E

Taking CD = 30 m and BE = 30 m, answer the following:
(i) Find the length AC. **[1]**
(ii) Find the horizontal distance CE. **[1]**
(iii) Find the length BC. **[2]**
OR Find the horizontal distance between the feet of the two kites.

Q.37 A school is arranging students for three workshops. The numbers of students enrolled in Mathematics, Science and Computer Applications are 84, 126 and 168 respectively. The school wants to divide students of each workshop into rooms so that every room has the same number of students and no student is left out.

Workshop	Students
Mathematics	84
Science	126
Computer Applications	168

(i) Find the maximum number of students that can be seated in each room. **[1]**
(ii) Find the minimum number of rooms required. **[1]**
(iii) Find the LCM of 84, 126 and 168. **[2]**
OR Find the product of their HCF and LCM.

SECTION E — CONTINUED

Q.38 A standard deck contains 52 playing cards: 13 cards of each of the four suits—hearts, diamonds, clubs and spades. There are 12 face cards (J, Q and K) in the deck.

Suit	Number of cards	Face cards
Hearts	13	3
Diamonds	13	3
Clubs	13	3
Spades	13	3
Total	52	12

(i) Find the probability of getting a spade. **[1]**
(ii) Find the probability of getting a red face card. **[1]**
(iii) Find the probability of getting a queen or a diamond. **[2]**
OR Find the probability of getting a card that is neither a face card nor an ace.

End of Question Paper