KENDRIYA VIDYALAYA SANGATHAN, CHENNAI REGION
SECOND PRE-BOARD EXAMINATION (2025-26)
SUB: MATHEMATICS (BASIC); Code No. 241

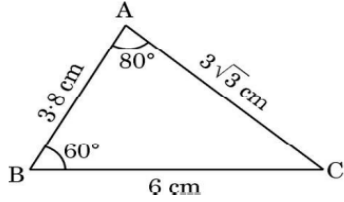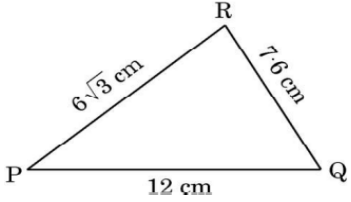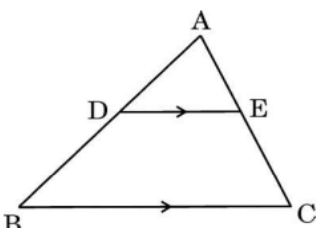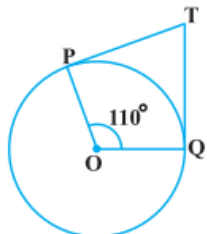<u>**CLASS – X**</u>   **Max. Marks: 80**   <u>**Time Allowed: 3 hours**</u>
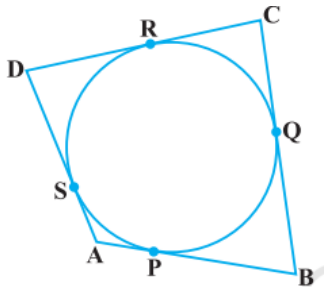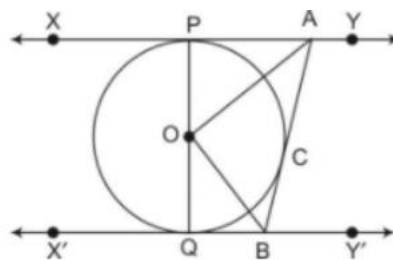
General Instructions:
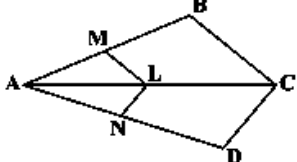**Read the following instructions carefully and follow them:**
1. This question paper contains 38 questions. All Questions are compulsory.
2. This Question Paper is divided into 5 Sections A, B, C, D and E.
3. In Section A, Question numbers 1-18 are multiple choice questions (MCQs) and question no.19 and 20 are Assertion- Reason-based questions of 1 mark each.
4. In Section B, Question numbers 21-25 are very short answer (VSA) type questions, carrying 02 marks each.
5. In Section C, Question numbers 26-31 are short answer (SA) type questions, carrying 03 marks each.
6. In Section D, Question numbers 32-35 are long answer (LA) type questions, carrying 05 marks each.
7. In Section E, Question numbers 36-38 are case study-based questions carrying 4 marks each with sub parts of the values of 1, 1 and 2 marks each respectively.
8. There is no overall choice. However, an internal choice of 2 questions of Section B, 2 questions of Section C and 2 questions of Section D have been provided. An internal choice has been provided in all the 2 marks questions of Section E.
9. Draw neat and clean figures wherever required. Take π = 22/7 wherever required if not stated.
10. Use of calculators is not allowed.

	SECTION – A (Multiple Choice Questions) **Each MCQ of 1mark, has four options with only one correct option, choose the correct option:**	
Q1	The HCF of two numbers 65 and 104 is 13. If LCM of 65 and 104 is 40x, then the value of x is (A)10 (B)6 (C)13 (D)40	1
Q2	The exponent of 2 in the prime factorisation of 144, is (A) 4 (B) 5 (C) 6 (D) 3	1
Q3	A quadratic polynomial whose sum and product of zeroes are 8 and 5 respectively: (A)$k(x^2 + 8x + 5)$ (B) $k(x^2 - 8x + 5)$ (C) $k(x^2 - 5x + 8)$ (D) $k(x^2 + 5x - 8)$	1
Q4	The value of k for which the pair of equations kx = y + 2 and 6x = 2y + 4 has infinitely many solutions, (A) k = 3 (B) k = -3 (C) k = 4 (D)does not exist	1
Q5	The discriminant of the quadratic equation $x^2 – 3x + 2 = 0$ is: (A) 1 (B) 17 (C) – 1 (D) $\sqrt{17}$	1
Q6	If the equation $x + \frac{1}{x} = 3$ (x$\neq$ 0) is expressed as a quadratic equation in the form of $ax^2 + bx + c = 0$, then the value of a + b + c is: (A) 5 (B) 2 (C) – 1 (D) 1	1
Q7	If the nth term of an A.P. is $a_n = 2n + 3$, then the common difference is (A) 5 (B) 3 (C) 2 (D) 1	1
Q8	The mid-point of a line segment divides the line segment in the ratio: (A) 1 : 2 (B) 2 : 1 (C) 1 : 1 (D) ½ : 2	1

Q9	If sinα = $\frac{1}{\sqrt{2}}$ and tanβ = 1, then find the value of cos (α+β)	1
	(A)1 (B) $\frac{1}{\sqrt{2}}$ (C) $\frac{\sqrt{3}}{2}$ (D) 0	
Q10	$\sqrt{2}\,sin^2\,A + \sqrt{2}\,cos^2\,A$ is equal to	1
	(A) $\sqrt{2}$ (B) $\sqrt{3}$ (C) $\sqrt{5}$ (D) 2	
Q11	From the figure given below, which of the following is true:	1
	(A)∠P = 60° (B) ∠P = 80° (C) ∠P = 40° (D) ∠P can not be determined	
Q12	In ΔABC, DE ∥ BC, If AE: EC = 2: 3 then DE: BC is equal to	1
	(A) 2:3 (B) 3:5 (C) 3:2 (D) 2:5	
Q13	In a trapezium ABCD, $AD\parallel BC$ and AD = 4cm. If AC and BD intersect each other at O, such that $\frac{AO}{OC} = \frac{DO}{OB} = \frac{1}{2}$ then BC is equal to	1
	(A) 6 cm (B) 7 cm (C) 8 cm (D) 9 cm	
Q14	TP and TQ are tangents drawn to the circle with the centre at O, if $\angle POQ = 110°$, then	1
	∠PTQ is:	
	(A)60° (B)80° (C)90° (D)70°	
Q15	From point P, which is at a distance of 13 cm from the centre O of a circle of radius 5cm, the pair of tangents PQ and PR to the circle are drawn. The lengths (in cm) of tangents PQ and PR are: (in cm)	1
	(A)18, 13 (B) 12, 12 (C) 13, 13 (D) 12, 18	
Q16	The volume of a cone of radius 'r' and height '3r' is:	1
	(A)$\frac{1}{3}\pi r^3$ (B) πr^3 (C)$9\pi r^3$ (D) $3\pi r^3$	
Q17	The sum of the lower limit of the median class and the upper limit of the modal class in the following data is:	1

Class Interval	10 - 20	20 - 30	30 - 40	40 - 50
No of students	12	18	8	22

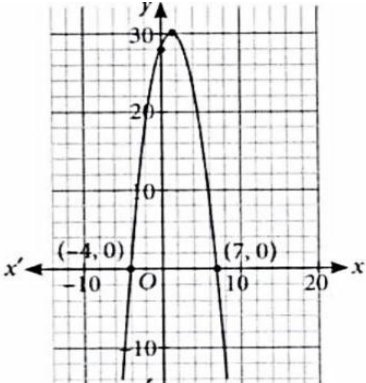(A) 70 cm   (B) 24 cm   (C) 36 cm   (D) 34 cm

Q18	In a random experiment of throwing a die, which of the following is a sure event? (A) Getting a number between 1 and 6 (B) Getting an odd number less than 7 (C) Getting an even number less than 7 (D) Getting a natural number less than 7	1
	Each of the following questions 19 & 20 contains two statements, i.e. ASSERTION and REASON, and has following four choices. Only one of which is correct. Choose the correct answer: (A) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A). (B) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A). (C) Assertion (A) is true but reason (R) is false. (D) Assertion (A) is false but reason (R) is true.	
Q19	**Assertion (A):** If LCM of two numbers is 90 and their product is 1350, then HCF is 20. **Reason (R):** HCF (a, b) × LCM (a, b) = a × b.	1
Q20	**Assertion(A)**: 10th term of an AP is 41 whose first term is 5 and common difference is 4. **Reason (R)**: n^{th} term of an AP is $a_n = a + (n - 1)d$ where a = first term, d = common difference.	1

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SECTION – B (Very Short Answers)
This section comprises of VSA of 2 marks each
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Q21	(A) Find the 20th term from the last term of the AP: 3, 8, 13, . . ., 253. **OR** (B) Which term of the A.P. 103, 96, 89 …….. is (−93)?	2
Q22	Evaluate: $2 \tan^2 45° + \cos^2 30° - \sin^2 60°$.	2
Q23	Prove that: The lengths of tangents drawn from an external point to a circle are equal.	2
Q24	Find the mode of the following frequency distribution: 	Marks	10-20	20-30	30-40	40-50	50-60	 |---|---|---|---|---|---| 	No. of students	15	30	45	12	18		2
Q25	(A) If (1, 2), (4, y), (x, 6) and (3, 5) are the vertices of a parallelogram taken in order, find x and y. **OR** (B) Find the point on x-axis which is equidistant from the points (2, −2) and (−4, 2).	2

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SECTION – C (Short Answers)
This section comprises of SA type questions of 3 marks each
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Q26	Prove that √3 is an irrational number.	3
Q27	Solve the following pair of linear equations: $3x + 4y = 10$; $2x - 2y = 2$	3

Q28	Prove that: $\dfrac{\cos A}{1+\sin A}+\dfrac{1+\sin A}{\cos A}=2\sec A$	3
Q29	(A) Find the values of y for which the distance between the points P $(2, -3)$ and Q $(10, y)$ is 10 units. **OR** (B) Find the coordinates of the points of trisection of the line segment joining $(4, -1)$ and $(-2, -3)$.	3
Q30	(A) In fig 1, a quadrilateral ABCD is drawn to circumscribe a circle. Prove that: AB + CD = AD + BC **fig 1**　　　　　**OR**　　　　　**fig 2** (B) In fig 2, XY and X'Y' are two parallel tangents to a circle with centre O and another tangent AB with point of contact C, intersecting XY at A and X'Y' at B, is drawn. Prove that: $\angle AOB = 90°$.	3
Q31	The ages of the patients admitted in a hospital are shown in the table given below. Find the **mean** of the given data: <table><tr><td>Age (In years)</td><td>5 – 15</td><td>15 – 25</td><td>25 – 35</td><td>35 – 45</td><td>45 – 55</td><td>55 – 65</td></tr><tr><td>No. of patients</td><td>6</td><td>11</td><td>21</td><td>23</td><td>14</td><td>5</td></tr></table>	3

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SECTION – D (Long Answers)
This section comprises of LA type questions of 5 marks each

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Q32	(A) The taxi charges in a city consist of a fixed charge together with the charge for the distance covered. For a distance of 10 km, the charge paid is ₹105 and for a journey of 15 km, the charge paid is ₹155. What are the fixed charges and the charge per km? Also find, how much does a person have to pay for travelling a distance of 25 km? **OR** (B) In a flight of 600km, an aircraft was slowed down due to bad weather. Its average speed for the trip was reduced by 200 km/hr from its usual speed and the time of the flight increased by 30 min. Find the scheduled duration of the flight.	5
Q33	(A) 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 from the same point the angle of elevation of the top of the pedestal is 45°. Find the height of the pedestal. **OR** (B) From the top of a 7 m high building, the angle of elevation of the top of a cable tower is 60° and the angle of depression of its foot is 45°. Determine the height of the tower.	5

Q34	Raghu bought a circular glass with wiper blade. He was eager to know the area being cleaned by the wiper blade in one swipe. With the help of a ruler and a protractor, he found the length of blade as 3 cm and angle swept by it is 60°. Find the area clean by wiper blade in one swipe.	3
	If the diameter of glass is 5 cm, how much area of the glass will be left uncleaned?	2
Q35	Prove that, if a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, the other two sides are divided in the same ratio. Also	3
	In the given figure, if LM ǁ CB and LN ǁ CD, prove that $$\frac{AM}{AB} = \frac{AN}{AD}.$$	2

SECTION – E (Case-study Based Questions)
This section comprises of 3 case-study based questions of 4 marks each with three sub-parts.

| Q36 | Two friends Trisha and Rohan during their summer vacations went to Manali. They decided to go for trekking. While trekking they observes that the trekking path is in the shape of a parabola. The mathematical representation of the track is shown in the graph. | |

Based on the above information, answer the following questions

   i) Find the zeroes of the polynomial?
   ii) Frame the quadratic polynomial with the given zeroes?
   iii) (A) If $f(x) = x^2 - 13x + 1$, then find $f(4) + f(-4)$ **1**
             OR   **1**
      (B) Find the zeroes of the polynomial: $16a^2 - 8a - 15$.   **2**

| Q37 | In a coffee shop, coffee is served in two types of cups. One is cylindrical in shape with diameter 7 cm and height 14 cm and the other is hemispherical in shape with diameter 21cm. | |

      i) Find the area of the base of the cylindrical cup.   **1**
      ii) What is curved surface of the cylindrical cup?   **1**
      iii) (A) What is the capacity of the hemispherical cup?   **2**
               OR
      (B) Find the capacity of the cylindrical cup?

| Q38 | Some of the students of class x took an assignment of studying the playing cards. During this, they played a game. The game was like drawing their desired card to win. One of the student Rose chose King of red colour, Divakar chose Ace of club and Sneha chose number card 10 of spade.

i) Find the probability that Rose will win when one card is drawn from a well-shuffled deck of 52 cards.

ii) Find the probability that Sneha will win when one card is drawn from a well-shuffled deck of 52 cards.

iii) (A) Find the probability that Divakar can win the game if the cards are shuffled well after removing all the face cards.

OR

(B) When one card is drawn from a well-shuffled deck of 52 cards, then find the probability of getting (a) a face card (b) a numbered card. | 1

1

2 |

******END OF PAPER******