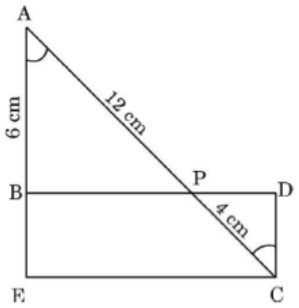
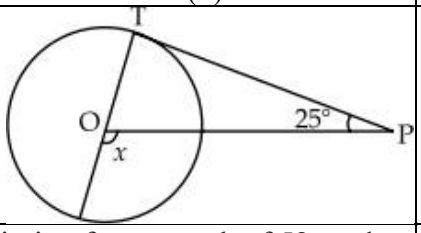
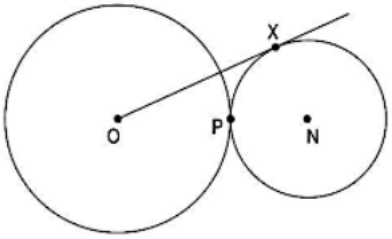
KENDRIYA VIDYALAYA SANGATHAN, CHENNAI REGION
SECOND PRE-BOARD EXAMINATION 2025-2026
MATHEMATICS STANDARD (041)

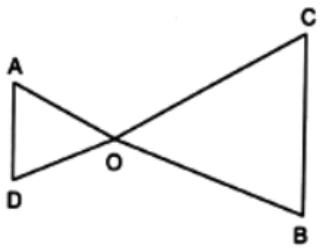
Time Allowed: 3Hrs **CLASS X** **Maximum Marks: 80**

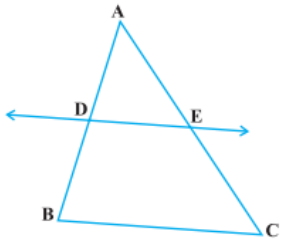
General Instructions:

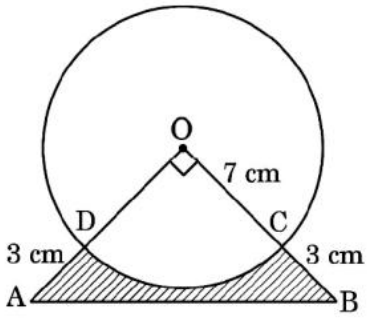
1. **This Question Paper has 5 Sections A, B, C, D and E.**
2. **Section A has 20 MCQs carrying 1 mark each**
3. **Section B has 5 questions carrying 2 marks each.**
4. **Section C has 6 questions carrying 3 marks each.**
5. **Section D has 4 questions carrying 5 marks each.**
6. **Section E has 3 case based integrated units of assessment (4 marks each) with sub-parts of the values of 1, 1 and 2 marks each respectively.**
7. **All Questions are compulsory. However, an internal choice in 2 Questions of 5 marks, 2 Questions of 3 marks and 2 Questions of 2 marks has been provided. An internal choice has been provided in the 2 marks questions of Section E**
8. **Draw neat figures wherever required. Take π =22/7 wherever required if not stated.**

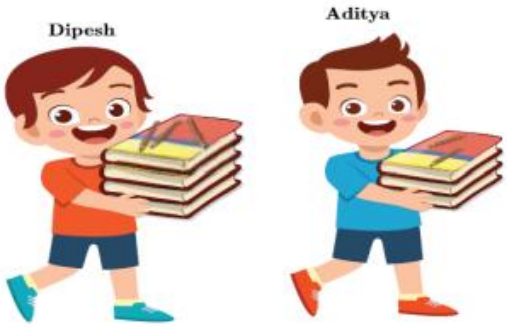
	SECTION-A	
Q.1	One equation of a pair of dependent linear equation $-5x + 7y = 2$. The second equation can be (a) $10x + 14y + 4 = 0$ (c) $-10x - 14y + 4 = 0$ (b) $-10x + 14y + 4 = 0$ (d) $10x - 14y + 4 = 0$	1
Q.2	In the given figure, $\angle A = \angle C$, $AB = 6\ cm$, $AP = 12\ cm$, $CP = 4\ cm$. Then length of CD is  (a) 2 cm (b) 6 cm (c) 8 cm (d) 18 cm	1
Q.3	In fig. PT is a tangent to a circle with centre O and $\angle TPO = 25^0$, then the measure of x is: (a) 120^0 (b) 125^0 (c) 110^0 (d) 115^0  	1
Q.4	2 cards of hearts and 4 cards of spades are missing from a pack of 52 cards. A card is drawn at random from the remaining pack. What is the probability of getting a black card: (a) $\frac{22}{52}$ (b) $\frac{22}{46}$ (c) $\frac{24}{52}$ (d) $\frac{24}{46}$	1
Q.5	If $3825 = 3^x \times 5^y \times 17^z$ then the value of $x + y - 2z$ is (a) 0 (b) 1 (c)2 (d) 3	1

Q.6	There are 10 observations in ascending arrangements. If last 5 observations are increased by 8,then Median (a) Increase by 8 (c) Remains same (b) Increase by 4 (d) Both a and b	1
Q.7	Two circles with centres O and N touch each other at point P as shown. O, P and N are collinear. The radius of the circle with centre O is twice that of the circle with centre N. OX is a tangent to the circle with centre N, and OX = 18 cm. What is the radius of the circle with centre N?  (a) $\frac{18}{\sqrt{2}}$ cm (c) $\frac{9}{\sqrt{2}}$ cm (b) 9 cm (d) $\frac{18}{\sqrt{10}}$ cm	1
Q.8	The condition for, one root of the quadratic equation $ax^2 + bx + c = 0$ to be twice the other, is (a) $b^2 = 4ac$ (b) $2b^2 = 9ac$ (c) $c^2 = 4a + b^2$ (d) $c^2 = 9a - b^2$	1
Q.9	The greatest number which divides 281 and 1249, leaving remainder 5 and 7 respectively, is (a) 23 (b) 276 (c) 138 (d) 69	1
Q.10	If $x \sin^3\theta + y \cos^3\theta = \sin\theta \cos\theta$ and $x \sin\theta = y \cos\theta$, then value of $x^2 + y^2$ is (a) 0 (b) $\frac{1}{2}$ (c) 1 (d) $\frac{3}{2}$	1
Q.11	A shoe store owner is planning to stock up for the upcoming month. To make an informed decision, she reviews the sales data of various shoe sizes from past six months. Which central tendency measure would help her in determining which shoe size to order the most of it. (a) Mean (b) Median (c) Mode (d) Any of these	1
Q.12	The zeroes of polynomial $ax^2 + bx + c$ are reciprocal of each other if (a) b = 2a (b) c = b (c) b = a (d) c = a	1
Q.13	The maximum number of common tangents that can be drawn to two circles intersecting at two distinct points is (a) 4 (b) 3 (c) 2 (d) 1	1
Q.14	For an event E, if $P(E) + P(\bar{E}) = q$, then the value of $q^2 - 4$ is (a) -3 (b) 3 (c) 5 (d) -5	1
Q.15	If $\Delta ABC \sim \Delta EDF$ and ΔABC is not similar to ΔDEF then which of the following is not true? (a) BC . EF = AC . FD (c) AB . EF = AC . DE (b) BC . DE = AB . EF (d) BC . DE = AB . FD	1
Q.16	If AB is a chord of a circle with centre at $O(2, 3)$, where the coordinates of A and B are (4, 3) and $(x, 5)$ respectively, then the value of x is (a) 2 (b) 3 (c) 4 (d) 5	1
Q.17	The base radii of a cone and a cylinder are equal. If their CSA are also equal, then the ratio of the slant height of the cone to the height of the cylinder is	1

	(a) 2:1 (b) 1:2 (c) 1:3 (d) 3:1	
Q.18	If $\cos(\alpha + \beta) = 0$ then the value of $cos\ (\frac{\alpha+\beta}{2})$ is (a) $\frac{1}{\sqrt{2}}$ (b) $\frac{1}{2}$ (c)0 (d) $\sqrt{2}$	1
	Questions number **19** and **20** are Assertion and Reason based questions. Two statements are given, one 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 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	
Q.19	**Assertion (A):** The HCF of two numbers is 5 and their product is 150 then their LCM is 30. **Reason (R):** $HCF(a, b) + LCM(a, b) = a \times b$	1
Q,20	**Assertion (A):** If a die is thrown, the probability of getting a number less than 3 & greater than 2 is zero. **Reason(R):** Probability of an impossible event is zero.	1
	SECTION-B	
Q.21	(A) Find the coordinate of the point dividing the line segment joining the points $A(1, 3)\ and\ B(4, 6)$ in the ratio 2: 1? **OR** (B) The mid-point of the line segment AB is $P(0, 4)$, if the coordinates of B are $(-2, 3)$ then find the coordinates of A	2
Q.22	In the figure, $OA \times OB = OC \times OD$, show that $\angle A = \angle C$ and $\angle B = \angle D$ 	2
Q.23	(A) Find the value of k such that the polynomial $x^2 - (k + 6)x + 2(2k + 1)$ has sum of its zeros equal to half of their product **OR** (B) If $\alpha\ and\ \beta$ are the zeros of the polynomial $x^2 - 4\sqrt{3}x + 3$, then find the value of $\alpha + \beta - \alpha\beta$.	2
Q.24	A bag contains 4 red, 3 blue and 2 yellow balls. One ball is drawn at random from the bag. Find the probability that drawn ball is (i) red (ii) not yellow.	2
Q.25	If $2\sin^2\theta - \cos^2\theta = 2$, then find the value of θ	2
	SECTION-C	
Q.26	If $\alpha\ and\ \beta$ are the zeros of a polynomial $2x^2 - 3x + 1$ then find the quadratic polynomial whose zeros are $3\alpha\ and\ 3\ \beta$	3

Q.27	Find the coordinates of the points of trisection of the line segment joining the points $A(1, -2)$ *and* $B(-3, 4)$.	3
Q.28	Prove that $(cosec\ A - \sin A)(\sec A - \cos A)(\cot A + \tan A) = 1$	3
Q.29	(A) Three bells toll at intervals of 9, 12, 15 minutes respectively. If they start tolling together, after what time will they next toll together? **OR** (B) Given that $\sqrt{2}$ is an irrational, prove that $5 + 3\sqrt{2}$ is an irrational number.	3
Q.30	Prove that the parallelogram circumscribing a circle is a rhombus.	3
Q.31	(A) A fast train takes 3 hours less than a slow train for a journey of 600 km. If the speed of the slow train is 10 km/hr less than that of the fast train, find the speed of each train. **OR** (B) A two-digit number is such that product of its digits is 14. If 45 is added to the number, the digits interchange their places. Find the number.	3
	SECTION-D	
Q.32	Prove Basic Proportionality Theorem, 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 Using this theorem, from the figure, find the value of AD if DE ∥ BC, DB=14 cm, AE=16 cm and EC=28cm. 	3 2
Q.33	A cubical block of side 7 cm is surmounted by a hemisphere. What is the greatest diameter the hemisphere can have? Find the surface area of the solid.	5
Q,34	(A)The ratio of the 10th term to its 30th term of an A.P is 1:3 and the sum of its first six terms is 42. Find the first term and the common difference of the A.P. **OR** (B) Two arithmetic progressions have the same first term. The common difference of one progression is 4 more than the other progression. 124th term of the first arithmetic progression is the same as 42nd term of the second. Find the common differences for APs.	5
Q.35	(A) From a point on the ground, the angles of elevation of the bottom and the top of a transmission tower fixed at the top of a 20m high building are 45° and 60° respectively. Find the height of the tower **OR** (B) An aeroplane when flying at a height of 3000m from the ground passes vertically above another aeroplane at an instant when the angles of elevation of the two planes from the same point on the ground are 60° and 45° respectively. Find the vertical distance between the aeroplanes at that instant. Also, find the distance of the first plane from the point of observation. ($Use\ \sqrt{3} = 1.73$)	5
	SECTION-E	

Q.36	In an annual day function of a school, the organizers wanted to give a cash prize along with a memento to their best students. Each memento is made as shown in the figure and its base ABCD is shown from the front side. The rate of silver plating is 20 per cm^2 **.**  **Based on the above, answer the following questions** (i) What is the area of the quadrant ODCO? (ii) Find the area of ΔAOB. (iii) **(a)**What is the length of arc CD? **OR** (b)What is the total cost of silver plating of the shaded part ABCD?	 1 1 2
Q.37	*Bingo is a popular game of chance where players match numbers on their cards to those randomly drawn by a caller. The first player to achieve a specific pattern (commonly five in a row) and call out "Bingo!" wins the round. The basic rules for playing Bingo are simple and can be enjoyed by people of all ages.* BINGO is game of chance. The host has 75 balls numbered 1 through 75. Each player has a BINGO card with some numbers written on it. The participants cancels the number on the card when called out a number written on the ball selected at random. Whosoever cancels all the numbers on his/her card, says BINGO and wins the game. The table given below, shows the data of one such game where 48 balls were used before Tara said 'BINGO'.  NUMBERS ANNOUNCED / NUMBER OF TIMES 0-15: 8 15-30: 9 30-45: 10 45-60: 12 60-75: 9 **Based on the above information, answer the following questions:** (i) Write the median class interval. (ii) Write the model class interval (iii) (a) Find the median of the given data. OR (b) Find the mode of the given data.	 1 1 2
Q,38	*In a small town, lived four friends Dipesh, Ramesh, Amar and Aditya. It was the beginning of a new school year. Dipesh and Aditya received some money from their parents to buy new stationery.*	

	Both was excited. Both hurried to the biggest stationery shop in the town, both friend's eyes wide at the sight of all the colorful and fancy items there. They immediately filled the basket with pens and notebooks with shiny covers. They didn't check the prices; they only focused on how fun everything looked. After purchasing, they went meet Amar & Ramesh to show their new pens and notebook. Dipesh bought 3 notebooks and 2 pens for Rs. 80. His friend Ramesh said that price of each notebook could be Rs. 25. Then three notebooks would cost Rs.75, the two pens would cost Rs. 5 and each pen could be for Rs. 2.50. Another friend Amar felt that Rs. 2.50 for one pen was too little. It should be at least Rs. 16. Then the price of each notebook would also be Rs.16  Aditya also bought the same types of notebooks and pens as Dipesh. He paid 110 for 4 notebooks and 3 pens. (i) Whether the estimation of Ramesh and Amar is applicable for Aditya? (ii) What is the exact cost of the notebook? **OR** What is the exact cost of the pen? (iii) What is the total cost if they purchase the same type of 15 notebooks and 12 pen ?	1 2 1

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