KENDRIYA VIDYALAYA SANGATHAN ,LUCKNOW REGION
MATHEMATICS STANDARD – Code No.041
PRE-BOARD I
CLASS – X (2025-26)

Maximum Marks: 80 **Time: 3 hours**

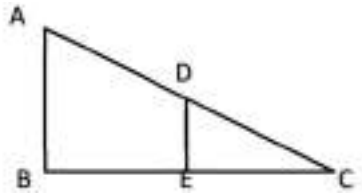
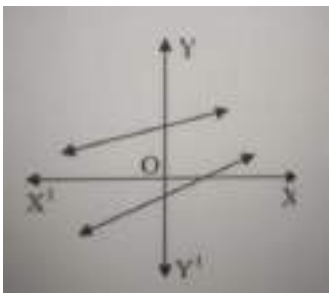
General Instructions:

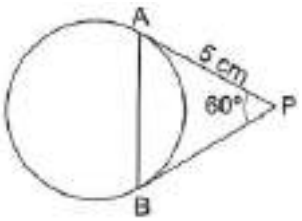
Read the following instructions carefully and follow them:

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 questions 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 in 2 questions of Section B, 2 questions of Section C and 2 questions of Section D has 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 π =22/7 wherever required if not stated.
10.Use of calculators is not allowed.

SECTION : A
(Section A consists of 20 questions of 1 mark each.)

Q.NO	Questions	Marks
Q. 1	If the path traced by the car has zeroes at -1 and 2, then it is given by (a) $x^2 + x + 2$ (b) $x^2 - x + 2$ (c) $x^2 - x - 2$ (d) $x^2 + x - 2$	**1**
Q. 2	In a group of 20 people. 5 can't swim. If one person is selected at random, then the probability that he/she can swim is (a) 3/4 (b) 1/3 (c) 1 (d) 1/4	**1**
Q. 3	If the lines given by 3x +2ky =2 and 2x+5y +1=0 are not parallel, then k has to be (a) 15/4 (b) ≠15/4 (b) any rational number (d) any rational number having 4 as denominator	**1**
Q. 4	If 2x + y = 13 and 4x – y = 17, find the value of (x – y). (a) 5 (b) 3 (c) 2 (d) 4	1

Q. 5	In ABC, DE ∥ AB. If AB = a, DE = x, BE = b and EC = c.  Then x expressed in terms of a, b and c is: (a) ac/b (b) ac/b+c (c) ab/c (d) ab/b+c	1
Q. 6	If $T_n = 2n - 3$ then what is the common difference of A.P ? (a) -2 (b) 5 (c) 3 (d) 2	1
Q. 7	What is the ratio in which the line segment joining (2,-3) and (5, 6) is divided by x-axis? (a) 1:2 (b) 2:1 (c) 2:5 (d) 5:2	1
Q. 8	Find the value of $\boldsymbol{k}$ for which the quadratic equation $2x^2 - kx + k = 0$ has equal roots. (a) only 0 (b) only 8 (c) 0 and 8 (d) can't find	1
Q. 9	The graph of a quadratic polynomial p(x) passes through the points (-6,0), (0, -30), (4,-20) and (6,0). The zeroes of the polynomial are (a) - 6,0 (b) 4, 6 (c) - 30,-20 (d) - 6,6	1
Q. 10	The shortest distance (in units) of the point (2,3) from y-axis is (a) 2 (b) 3 (c) 5 (d) 1	1
Q. 11	(sec A + tan A) (1 – sin A) equals: (a) sec A (b) sin A (c) cosec A (d) cos A	1
Q. 12	If sin A = $\frac{3}{5}$ then cosA is equal to : (a) 0 (b) 1 (c) $\frac{4}{5}$ (d) $\frac{5}{8}$	1
Q. 13	In the given figure, graphs of two linear equations are shown. The pair of these linear equations is:  (a) consistent with unique solutions (b) consistent with infinitely many solutions	1

	(c) inconsistent. (d) inconsistent but can be made consistent by extending these lines.	
Q. 14	If $x = \frac{1}{\sqrt{3}}$ is a root of the equation $P\,x^2 + (\sqrt{3} - \sqrt{2})x - 1 = 0$, then the value of $P^2 + 1$ is : (a) $\sqrt{6}$ (b) 6 (c) 7 (d) 8	1
Q. 15	In the given figure, PA and PB are tangents to the given circle such that PA = 5 cm and ∠APB = 60°. The length of chord AB is :  (a) 5 √2 cm (b) 5 cm (c) 5 √3 cm (d) 7.5 cm	1
Q. 16	A pair of irrational numbers whose product is a rational number is (a) (√16, √4) (b) (√5, √2) (c) (√3, √27) (d) (√36, √2)	1
Q. 17	If 'n' is any natural number, then $(12)^n$ cannot end with the digit (a) 2 (b) 4 (c) 8 (d) 0	1
Q. 18	If x is the LCM of 4, 6, 8 and y is the LCM of 3, 5, 7 and p is the LCM of x and y, then which of the following is true? (a) p = 35x (b) p = 4y (c) p = 13x (d) p = 16y	1

DIRECTION: In the question number 19 and 20, a statement of **assertion (A)** is followed by a statement of **Reason (R)**.
Choose the correct option

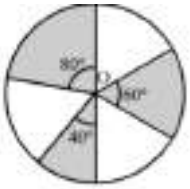
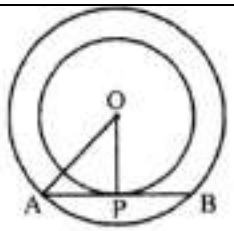
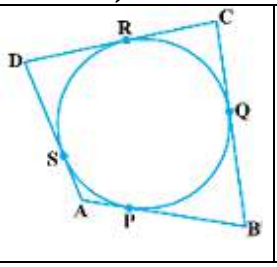
A) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A)

B) Both assertion (A) and reason (R) are true and 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	***Statement A (Assertion):*** a, b, c are in AP if and only if 2b = a + c ***Statement R(Reason)*** **:** The sum of the first n odd natural numbers is n^2.	1

Q. 20	***Statement A (Assertion):*** If $x=2\sin^2\theta$ and $y=2\cos^2\theta+1$ then the value of $x+y=3$. ***Statement R(Reason)*** **:** For any value of θ, $\sin^2\theta+\cos^2\theta=1$	1
	SECTION :B **(Section B consists of 5 questions of 2 marks each.)**	
Q. 21	Find the discriminant of the quadratic equation $4x^2 - 5 = 0$ and hence comment on the nature of the roots of the equation.	2
Q. 22	Find the relation between p and q if x = 3 and y = 1 is the solution of the pair of equations x - 4y + p = 0 and 2x + y - q -2 = 0. **OR** Check whether the point (−4, 3) lies on both the lines represented by the linear equations x + y + 1 = 0 and x − y = 1.	2
Q. 23	In the given figure, three sectors of a circle of radius 7 cm, making angles of 60°, 80° and 40° at the centre are shaded. Find the area of the shaded region. **OR** A piece of wire 22 cm long is bent into the form of an arc of a circle subtending an angle of 60° at its centre. Find the radius of the circle 	2
Q. 24	A box contains 5 red marbles, 8 white marbles and 4 green marbles. One marble is taken out of the box at random. What is the probability that the marble taken out will be (i) Red ? (ii) Not green?	2
Q. 25	Two concentric circles (as given in figure below) are of diameters 30 cm and 18 cm. Find the length of the chord of the larger circle which touches the smaller circle. 	2
	SECTION : C **(Section C consists of 6 questions of 3 marks each.)**	
Q. 26	A quadrilateral ABCD is drawn to circumscribe a circle. Prove that AB + CD = AD + BC 	3

Q. 27	Given that √2 is irrational, prove that 5 - 3√2 is irrational.	3
Q. 28	A juice seller was serving his customers using glasses as shown in Figure .The inner diameter of the cylindrical glass was 5 cm, but the bottom of the glass had a hemispherical raised portion which reduced the capacity of the glass. If the height of a glass was 10 cm, find the apparent capacity of the glass and its actual capacity. (Use pi = 3.14.) **OR** A vessel is in the form of an inverted cone. Its height is 8 cm and the radius of its top, which is open, is 5 cm. It is filled with water up to the brim . When lead shots, each of which is a sphere of radius 0.5 cm are dropped into the vessel, one-fourth of the water flows out. Find the number of lead shots dropped in the vessel. 	3
Q. 29	A box contains 90 discs which are numbered from 1 to 90. If one disc is drawn at random from the box, find the probability that it bears (i) a two-digit number . (ii) a perfect square number. (iii) a number divisible by 5.	3
Q. 30	If α and β are zeroes of a quadratic polynomial $x^2 - 5$, then form a quadratic polynomial whose zeroes are 1+α and 1+β .	3
Q. 31	Prove that a parallelogram circumscribing a circle is a rhombus. **OR** Two tangents PA and PB are drawn to a circle with centre O from an external point P. Prove that ∠APB= 2(∠OAB)	3
	SECTION :D **(Section D consists of 4 questions of 5 marks each.)**	
Q. 32	A chord of a circle of radius 12 cm subtends an angle of 120° at the centre. Find the area of the corresponding segment of the circle. (Use π = 3.14 and $\sqrt{3}$ = 1.73)	5
Q. 33	State and Prove Basic Proportionality theorem.	5
Q. 34	Find the mean and median of the following data: 	Class	85-90	90-95	95-100	100-105	105-110	110-115
---	---	---	---	---	---	---
frequency	15	22	20	18	20	25		5

OR

If the median of the distribution given below is 28.5, find the values of x and y.

Class interval	**0-10**	**10-20**	**20-30**	**30-40**	**40-50**	**50-60**
Frequency	**5**	x	**20**	**15**	y	**5**

Q. 35 A boy standing on a horizontal plane finds a bird flying at a distance of 100 m from him at an elevation of 30°. A girl standing on the roof of a 20 m high building, finds the elevation of the same bird to be 45°. The boy and the girl are on the opposite sides of the bird. Find the distance of the bird from the girl. (Given $\sqrt{2}$= 1.414) — 5

OR

A Ladder set against a wall at an angle 45º to the ground. If the foot of the ladder is pulled away from the wall through a distance of 4 m, its top slides a distance of 3 m down the wall making an angle 30° with the ground. Find the final height of the top of tire ladder from the ground and length of the ladder.

SECTION :E

(Case study based questions are compulsory.)

Q. 36 Ms. Sheela visited a store near her house and found that the glass jars are arranged one above the other in a specific pattern. On the top layer there are 3 jars. In the next layer there are 6 jars. In the 3rd layer from the top there are 9 jars and so on till the 8th layer.

On the basis of the above situation answer the following questions.

(i) Write an A.P whose terms represent the number of jars in different layers starting from top . Also, find the common difference. — 1

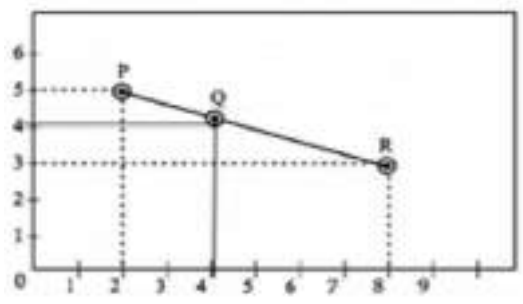
(ii) Is it possible to arrange 34 jars in a layer if this pattern is continued? Justify your answer. — 1

(iii) If there are 'n' number of rows in a layer then find the expression for finding the total number of jars in terms of n. Hence find S_8 — 2

OR

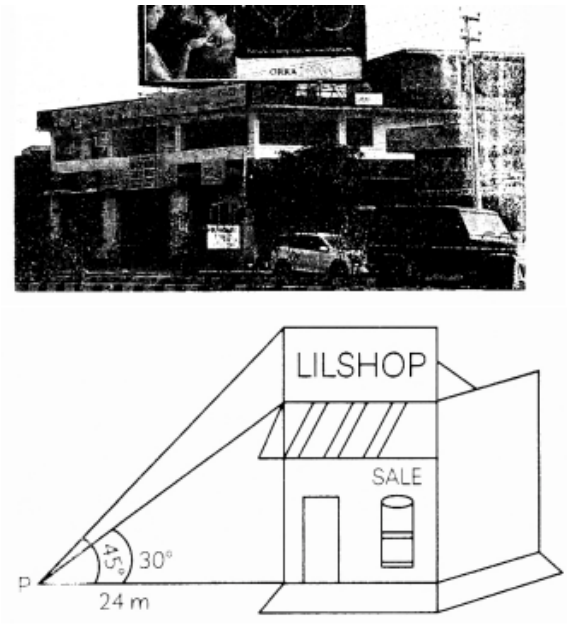
The shopkeeper added 3 jars in each layer. How many jars are there in the 5th layer from the top?

Q. 37 A group of class X students goes to picnic during winter holidays. The position of three friends Aman, Kirti and Chahat are shown by the points P, Q and R



.

(i) Find the distance between P and R. — 1

(ii)	Is Q, the midpoint of PR? Justify by finding midpoint of PR.	1
(iii)	Find the point on x-axis which is equidistant from P and Q. **OR** Let S be a point which divides the line joining PQ in ratio 2:3. Find the coordinates of S.	2
Q. 38	Anita purchased a new building for her business. Being in the prime location, she decided to make some more money by putting up an advertisement sign for a rental ad income on the roof of the building. From a point P on the ground level, the angle of elevation of the roof of the building is 30° and the angle of elevation of the top of the sign board is 45°. The point P is at a distance of 24 m from the base of the building.  On the basis of the above information, answer the following questions:	
(i)	Find the height of the building (without the sign board). **OR** The height of the building (with the sign board).	2
(ii)	Find The height of the sign board.	1
(iii)	Find the distance of the point P from the top of the sign board.	1