KENDRIYA VIDYALAYA SANGATHAN, RAIPUR REGION
FIRST PRE-BOARD EXAM (2025-26)
Subject: MATHEMATICS BASIC (Code-241)

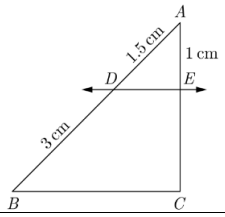
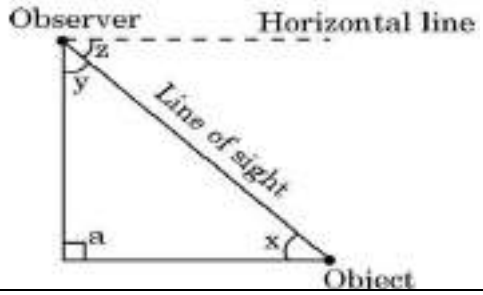
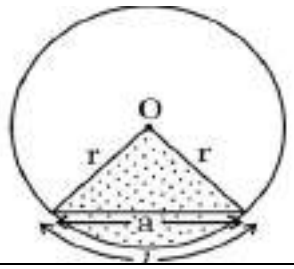
Class: X
Max. Marks: 80 **Time: 3.00 HRS**
General Instructions:

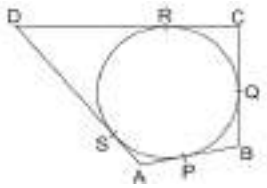
Read the following instructions carefully and strictly follow them:

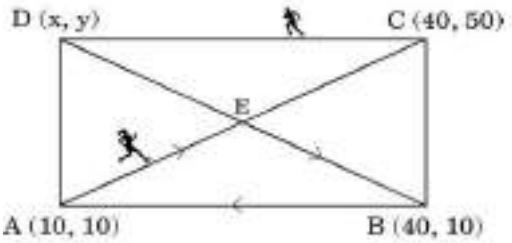
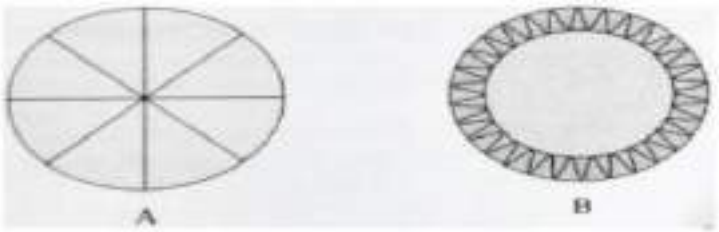
i. This question paper contains **38** questions. **All** questions are **compulsory.**
ii. This question paper is divided into **five** sections**- A, B, C, D and E.**
iii. In **Section A,** Questions no. **1 to 18** are Multiple Choice Questions (MCQs) and questions number **19 and 20** are Assertion-Reason 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. Internal choice is provided in 2 marks questions in each case study.
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 3 questions in Section E.
ix. Draw neat diagrams wherever required. Take $\pi = \frac{22}{7}$ wherever required, if not stated.
x. Use of calculator is **not** allowed.

SECTION–A
(Multiple Choice Questions)
Each MCQ of 1mark ,has four options with only one correct option ,choose the correct option

Q.N	Question	Marks
1.	The number $3+\sqrt{2}$ is: (A) a rational number (B) an irrational number (C) an integer (D) a natural number	1
2.	The value of the polynomial $f(x) = x^2 - 4x + 4$ at $x = 2$ is: (A) 0 (B) 4 (C) 2 (D) -2	1
3.	If a pair of linear equations has a unique solution, then the lines represented are: (A) Intersecting (B) Parallel (C) Coincident (D) None of these	1
4.	Which of the following is **not** a quadratic equation? (A)$(x+2)^2=2(x+3)$ (B)$x^2+3x=(-1)(1-3x^2)$ (C)$(x+2)(x-1)=x^2-2x-3$ (D) $x^3-x^2+2x+1=(x+1)^3$	1
5.	If the common difference of an AP is 5, then what is $a_{18} - a_{13}$? (A) 5 (B) 20 (C) 25 (D) 30	1
6.	The n^{th} term of the AP a, 3a , 5a , ... is (A) na (B) (2n-1)a (C) (2n+1)a (D) 2na	1
7.	The mid-point of the line segment joining points (1, 3) and (1,- 3) lies : (A) at the origin (B) in the second quadrant (C) on x-axis (D) on y-axis	1
8.	The distance of the point (2, 3) from the origin is : (A) 2 (B) 3 (C) 5 (D) $\sqrt{13}$	1

9.	A vertical stick of length 7.5 m casts a shadow 5 m long on the ground and at the same time a tower casts a shadow 24 m long. Find the height of the tower. (A) 20 m (B) 40 m (C) 60 m (D) none of these	1
10.	If in ΔABC and ΔDEF, $\frac{AB}{EF} = \frac{AC}{DE}$ then they will be similar when (A) ∠A = ∠D (B) ∠A = ∠E (C) ∠C = ∠F (D) ∠B = ∠E	1
11.	In the given figure, DE ll BC. The value of EC (A)1.5 cm (B) 3 cm (C) 2 cm (D) 1 cm 	1
12.	From an external point Q, the length of tangent to a circle is 12 cm and the distance of Q from the centre of circle is 13 cm. The radius of circle (in cm) is (A) 10 (B) 5 (C) 12 (D) 7	1
13.	Which one of the following is **not** equal to unity? (A) $\sin^2A+\cos^2A$ (B) $\cot^2A - \operatorname{cosec}^2A$ (C) $\sec^2A - \tan^2A$ (D) tanA.cotA	1
14.	In the given figure, which of the following angles represents the angle of depression? (A) x (B) y (C) z (D) a 	1
15.	The perimeter of the shaded region in the given figure is (A) l (B) l + a (C) l + 2r (D) l + 2r + a 	1
16.	If the mode of a distribution is 8 and its mean is also 8, then find median. (A) 11 (B) 12 (C) 8 (D) 14	1
17.	Consider the following frequency distribution Class: 0-5 | 5-10 | 10-15 | 15-20 | 20-25 Frequency: 11 | 12 | 12 | 9 | 11 The upper limit of median classis: (A)10 (B) 13 (C) 15 (D) 20	1
18.	Two dice are thrown at the same time, what is the probability that the sum appearing on the two top 8 is ------- (a) 5/8 (b) 5/36 (c) 5/12 (d) None	1
	Questions number **19** and **20** are Assertion and Reason based questions. Two statements are given, one labeled as Assertion (A) and the other is labeled 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.	

19.	**ASSERTION (A)**: Line joining the midpoints of two sides of triangle is parallel to the third side. **REASON (R)**: If a line divides two sides of a triangle in the same ratio then it is parallel to the third side.	1
20.	**ASSERTION (A)**: If the value of mode and mean is 60 and 66 respectively, then the value of median is 64. **REASON (R)**: Median = (mode + 2 mean)/2	1
	SECTION – B (Very Short Answers) **This section comprises of VSA of 2 marks each**	
21.	**(A)**Showthatthenumber2× 5 ×7 × 11+ 11 × 13isacompositenumber. **OR** **(B)**Find thesmallestnumberwhichisdivisiblebyboth306and657.	2
22.	If α and β are the zeroes of polynomial p(x) =x^2+3x+2, find a quadratic polynomial whose zeroes are $\alpha + 1, \beta + 1$.	2
23.	Find the nature of roots of the quadratic equation $\boldsymbol{x}^2$ -5$\boldsymbol{x}$ +6=0.	2
24.	Find the length of tangent drawn to a circle with radius 7 cm from a point 25 cm away from the centre.	2
25.	Evaluate: $\tan^2 30° - \tan^2 60° + cosec^2 45°$	2
	SECTION – C (Short Answers) **This section comprises of SA type questions of 3 marks each**	
26.	Prove that $\sqrt{5}$ is an irrational	3
27.	**(A)** Solve the following system of equations graphically: x + 3y = 6; 2x + 3y = 12 **OR** **(B)**x and y are complementary angles such that x: y = 1: 2. Express the given information as a system of linear equations in two variables and hence solve it.	3
28.	If the 3rd and the 9th terms of an AP are 4 and – 8 respectively, which term of this AP is zero?	3
29.	A quadrilateral ABCD is drawn to circumscribe a circle, as shown in the given figure.  Show that $\frac{AB + CD}{AD + BC} = 1$	3
30.	Prove the following trigonometric identity: $\frac{cos\theta}{1 + sin\theta} + \frac{1 + sin\theta}{cos\theta} = 2sec\theta$	3
31.	The mode of the following distribution is 43.75. Find the missing frequency *p*. *Class Interval*: 20-30 | 30-40 | 40-50 | 50-60 | 60-70 *Frequency*: 25 | 47 | 62 | *p* | 10	3
	SECTION–D **(Long Answers)** ***This section comprises of LA type questions of 5marks each***	
32.	**(A)** The sum of areas of two squares is 2650 cm^2. If the sum of their perimeters is 280 cm, find the sides of the two given squares. **OR** **(B)** Express the equation $\frac{1}{x} - \frac{1}{x-2} = 3$ (x≠ 0, 2) as a quadratic equation in standard form. Hence, find the roots of the quadratic equation so obtained.	5
33.	Prove that a line is drawn parallel to one side of a triangle to intersect the other two sides in two distinct points, then the other two sides are divided in the same ratio.	5
34.	The angle of elevation of the top of a building from the foot of the tower is 30° and the angle of elevation of the top of the tower from the foot of the building is 60°. If	5

	the tower is 50 m high, find the height of the building.	
35.	**(A)** A toy is in the form of a cone surmounted on a hemisphere. The cone and hemisphere have the same radii. The height of the conical part of the toy is equal to the diameter of its base. If the radius of the conical part is 5 cm, find the volume of the toy. **OR** **(B)** A cubical block is surmounted by a hemisphere of radius 3·5 cm. What is the smallest possible length of the edge of the cube so that the hemisphere can totally lie on the cube? Find the total surface area of the solid so formed.	5
	SECTION E **This section has 3 case study-based questions carrying 4 marks each.**	
36.	**Case Study-1** A field is in the form of a rectangle. The coordinates of the rectangular field ABCD are A(10, 10), B(40, 10), C(40, 50) and D(x, y). Anil and Anita, two friends decided to have a race. Anita started from point A and moved to point E along the diagonal AC, where E is the point of intersection of both the diagonals of ABCD. From point E, she moved to point B along the other diagonal DB and then moved back to point A along BA. While Anil started from point C and ran to point A via D along the boundary of the field.   Based on the above information, answer the following questions: (i) Find the coordinates of point E. (ii) Find the distance between the points B and C. (iii) (a) Find the coordinates of point D and the distance BD. **OR** (b) Find the total distance travelled by Anita.	 1 1 2 2
37.	**RakshaBandhan**, is a popular annual rite, or ceremony, which is celebrated in South Asia, and in other parts of the world significantly influenced by Hindu culture. On this day, sisters of all ages tie a talisman, or amulet, called the ***rakhi***, around the wrists of their brothers, symbolically protecting them, receiving a gift in return, and traditionally investing the brothers with a share of the responsibility of their  potential care.. **Observe the 2 designs of Rakhi** **Design A:** Rakhi**A** is made with silver wire in the form of a circle with diameter 28mm. The wire used for making 4 diameters which divide the circle into 8 equal parts.	

	Design B: Rakhi**B** is made of two colours - Gold and silver. Outer part is made with Gold. The circumference of silver part is 44mm and the gold part is 3mm wide everywhere. **Refer to Design A** (1). Find the total length of silver wire required (2) Find the area of each sector of the Rakhi **Refer to Design B** (3) (a) Find the circumference of outer part (golden) OR (b) Find Area of silver part ?	 1 1 2 2
38.	Anjal took a pack of 52 cards. She kept aside all the black face cards and shuffled the remaining cards well.  Based on the above information answer the following questions. (i) Write the number of total possible outcomes. (ii) She draws a card from the well-shuffled pack of remaining cards. What is the probability that the card is a face card? (iii) (a) Write the probability of drawing a black card. **OR** (b) What is the probability of getting neither a black card nor an ace card?	 1 1 2 2