KENDRIYA VIDYALAYA SANGATHAN LUCKNOW REGION
PRE-BOARD EXAMINATION (2025-26)

CLASS - X
MATHEMATICS (STANDARD) – Code No. 041

Maximum marks:80 **Time: 3 hours**

General Instructions: -
Read the following instructions carefully and follow them: -

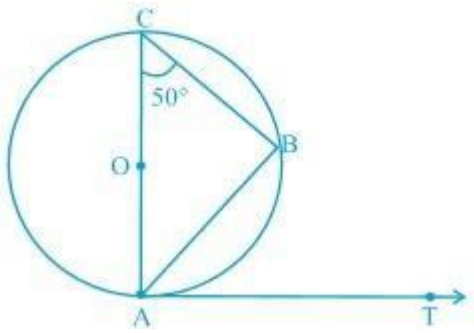
1. **This question paper contains 38 questions. All Questions are compulsory.**
2. **This Question Paper is divided into 5 Sections A, B, C, D and E.**
3. **In Section A, Question numbers 1-18 are multiple choice questions (MCQs) and question no.19 and 20 are Assertion- Reason based questions of 1 mark 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 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 = 227 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

Q. No.	Question	Marks
Q1.	If two positive integers a and b are written as $a = 4x^3y^2$ and $b=12xy^3$ where x, y are prime numbers, then HCF (a ,b) is A) xy B) 4xy C) x^3y^3 D) $4xy^2$	**1**

Q2.	The sum of exponents of prime factors in the prime-factorisation of 196 is A) 3 B) 4 C) 5 D) 6	**1**
Q3.	The quadratic equations $x^2 - 4x + k = 0$ has distinct real roots if A) $k = 4$ B) $k > 4$ C) $k = 16$ D) $k < 4$	**1**
Q4.	Value(s) of k for which the quadratic equation $2x^2 - kx + k = 0$ has equal roots is A) 0 only B) 4 C) 8 only D) 0 and 8	**1**
Q5.	Distance between the points A(0,6) and B(0,-2) is A) 7 B) 5 C) 8 D) -8	**1**
Q6.	If the point (x, y) is equidistant from the points A (5,1) and B(-1, 5) then A) 2x=3y B) 3x=2y C) x=y D) 4x=5y	**1**
Q7.	Which of the following is NOT a similarity criterion of tringles? A) AA B) SAS	**1**

	C) AAA D) RHS	
Q8.	A card is selected at random from a well shuffled deck of 52 cards. The probability of its being a face card is A) 3/26 B) 3/13 C) 2/13 D) 1/2	**1**
Q9.	If the area of circle is numerically equal to twice its circumference, then the diameter of the circle is A) 4 units B) 6 units C) 8 units D) 12 units	**1**
Q10.	In the following figure, AB is a chord of the circle and AOC is its diameter such that ∠ACB = 50°. If AT is the tangent to the circle at the point A, then ∠BAT is equal to.  A) 65° B) 60° C) 50°	**1**

	D) 40° **For visually impaired students .** Find the length of tangent drawn to a circle with radius 7 cm from a point 25 cm away from the centre. A) 24 cm B) 27 cm C) 26 cm D) 25 cm	
Q11.	TP and TQ are the two tangents to a circle with center O so that angle ∠ POQ = 130^0. Find PTQ. A) 50^0 B) 70^0 C) 80^0 D) none of these	**1**
Q12.	If the perimeter of a circle is equal to that of a square, then the ratio of their areas is A) 22:7 B) 14:11 C) 7:22 D) 11:14	**1**
Q13.	Sin 2A = 2 Sin A is true when A = A) 0° B) 30° C) 45°	**1**

	D) 60°	
Q14.	(Sec A + tan A) (1 – Sin A) = A) Sec A B) Sin A C) Cos A D) Cot A	**1**
Q15.	The heights (in cm) of 10 students are: 150, 155, 160, 165, 170, 170, 175, 180, 185, 190. What is the median height of the students? A) 165 cm B) 170 cm C) 172.5 cm D) 175 cm	**1**
Q16.	If the height of a pole is equal to the length of its shadow, then the angle of elevation of the sun is A) 30° B) 45° C) 60° D) 90°	**1**
Q17.	Consider the following frequency distribution. The lower limit of modal class is A) 15 B) 20	**1**

Class	0-5	5-10	10-15	15-20	20-25
Frequency	10	15	12	20	9

	C) 10 D) 5	
Q18.	A cube of 6cm is cut into number of cubes each of side 2cm.The number of cubes will be A) 9 B) 18 C) 27 D) 36	**1**

Each of the following questions contains two statements i.e., ASSERTION and REASON, and has following four choices.

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.

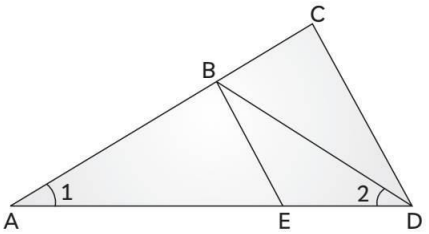
Only one of which is the correct answer.

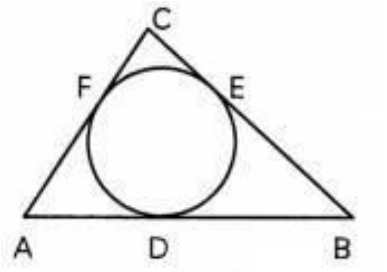
Q19.	**ASSERTION (A):** The HCF of two numbers is 9 and their LCM is 2016. If the one number is 54, then the other number is 336. **REASON (R):** Relation between numbers and their HCF and LCM is product of two numbers a, b = HCF (a, b) × LCM (a, b). A) Both assertion (A) and reason (R) are true and 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.	**1**
Q20.	**ASSERTION (A):** -5, -5/2 , 0,5/2 …….is an Arithmetic progression. **REASON (R):** The terms of an Arithmetic Progression cannot have both positive and negative rational numbers.	**1**

	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.	

SECTION – B
(Very Short Answers)

This section comprises of VSA of 2 marks each

Q. No.	Question	Marks
Q21.	For what values of k will the following pair of linear equations have infinitely many solutions? $Kx+ 3y – (k – 3) = 0$ and $12x + ky – k = 0$ **OR** If $217x + 131y = 913$, $131x + 217y = 827$, then find the value of x and y.	**2**
Q22.	Find the value of x if $2\ \text{cosec}^2 30^0 + x \sin^2 60^0 – 3/4 \quad \tan^2 30^0 = 10$	**2**
Q23.	In the given figure below, AD/AE=AC/BD and ∠1=∠2. Show that Δ BAE~ ΔCAD .  **For visually impaired students** Two triangles ABC and PQR are such that AB=3 cm,AC=6 cm, ∠A=70°,PR=9 cm,∠P=70°, and PQ=4.5 cm. Show that ΔABC ~ ΔPQR and state the similarity criterion.	**2**
Q24.	A circle is inscribed in a ΔABC having AB= 10cm, BC = 12cm and CA = 8cm and touching these sides at D, E, F respectively. Find the lengths of AD, BE and CF.	**2**

	 **For visually impaired students** From an external point P, tangents PA and PB are drawn to a circle with centre O. Prove that tangents PA & PB are equal in length.	
Q25.	The length of the minute hand of a clock is 14 cm. Find the area swept by the minute hand in 5 minutes. **OR** The radii of two circles are 8 cm and 6 cm respectively. Find the diameter of the circle having area equal to the sum of the areas of the two circles.	**2**

SECTION – C
(Short Answers)

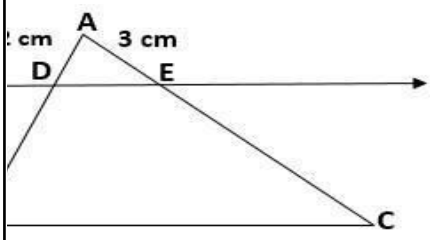
This section comprises of SA of 3 marks each

Q. No.	Question	Marks
Q26.	Given that √3 is irrational, prove that 2 + 5√3 is irrational.	**3**
Q27.	Find the zeroes of the quadratic polynomial $6x^2 - 7x - 3$ and verify the relationship between the zeroes and the coefficients of the polynomial.	**3**
Q28.	Which term of the AP : 3, 15, 27, 39, . . . will be 132 more than its 54th term?	**3**
Q29.	Prove that $(\text{Sin A} + \text{Cosec A})^2 + (\text{Cos A} + \text{Sec A})^2 = 7 + \tan^2 A + \text{Cot}^2 A$ **OR** Prove that $\frac{\cos\cos A}{1+sinA} + \frac{1+sinA}{cos\ A} = 2 \sec A$	**3**
Q30.	All the black face cards are removed from a pack of 52 playing cards. The remaining cards are well shuffled and then a card is drawn at random. Find the probability of getting	**3**

	(i) face card (ii) red card (iii) black card. **OR** Two coins are tossed simultaneously. What is the probability of getting (i) At least one head? (ii) At most one tail? (iii) A head and a tail?	
Q31.	Prove that a parallelogram circumscribing a circle is a rhombus.	**3**

SECTION – D
(Long Answers)

This section comprises of LA type questions of 5 marks each

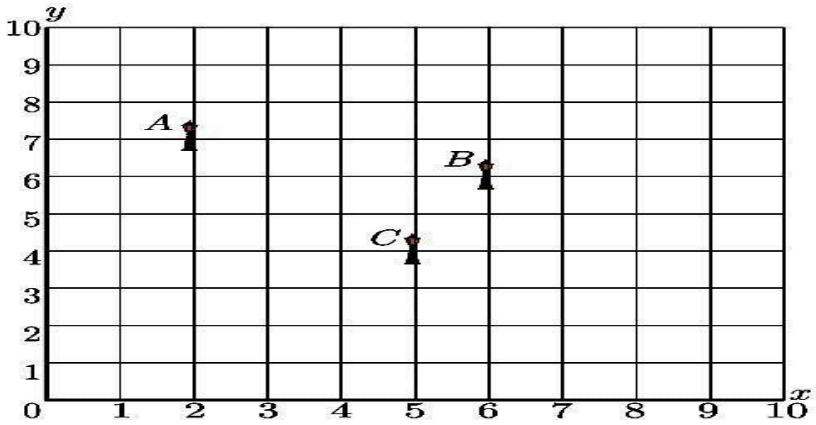
Q. No.	Question	Marks
Q32.	A man wished to give Rs. 12 to each person and found that he fell short of Rs. 6 when he wanted to give to all the persons present. He, therefore, distributed Rs. 9 to each person and found that Rs. 9 were left over. How much money did he have and how many persons were there? OR A father's age is three times the sum of the ages of his children. After 5 years, his age will be two times the sum of their ages. Find the present age of the father.	**5**
Q33.	State and prove Thales Theorem. In the figure, find EC if AD/DB = AE/EC using the above theorem. 	**5**
Q34.	A tent is in the shape of a cylinder surmounted by a conical top. If the height and diameter of the cylindrical part are 2.1 m and 4 m respectively, and the slant height of the top is 2.8 m, find the area of the canvas used for making the tent. Also, find the cost of the canvas of the tent at the rate of Rs. 500 per m^2. OR A rectangular metal block has length 15 cm, breadth 10 cm and height 5 cm. From this block, a circular hole of diameter 7 cm & height 5 cm is drilled out. Find: (i) the volume of the remaining solid (ii) the surface area of the remaining solid.	**5**
Q35.	The distribution below gives the marks of 100 students of a class, if the median marks are 24, find the frequencies $f1$ and $f2$	**5**

Marks	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40
No. of students	4	6	10	$f1$	25	$f2$	18	5

SECTION - E
(Case-study Based Questions)

This section comprises of 3 case-study based questions of 4 marks each with three sub-parts.

Q. No.	Question	Marks
Q36.	. **CASE STUDY -1** In the month of April to June 2022, the exports of passenger cars from India increased by 26% in the corresponding quarter of 2021–22, as per a report. A car manufacturing company planned to produce 1800 cars in 4th year and 2600 cars in 8th year. Assuming that the production increases uniformly by a fixed number every year.  Based on the above information answer the following questions. (i) Find the production in the 1st year. (ii) Find the production in the 12th year. (iii) Find the total production in first 10 years. OR (iii) In how many years will the total production reach 31200 cars?	**(1)** **(1)** **(2)** **(2)**
Q37.	**CASE STUDY -2** Resident Welfare Association (RWA) of a Gulmohar Society in Delhi have installed three electric poles A, B and C in a society's common park. Despite these three poles, some parts of the park are still in dark. So, RWA decides to have one more electric pole D in the park. The park can be modelled as a coordinate systems given below.	



On the basis of the above information, answer any four of the following questions: **(2)**

(i) What is the position of the pole C? **(1)**

(ii) What is the distance of the pole B from the corner O of the park? **(1)**

(iii) Find the position of the fourth pole D so that four points A, B, C and D form a parallelogram. **(2)**

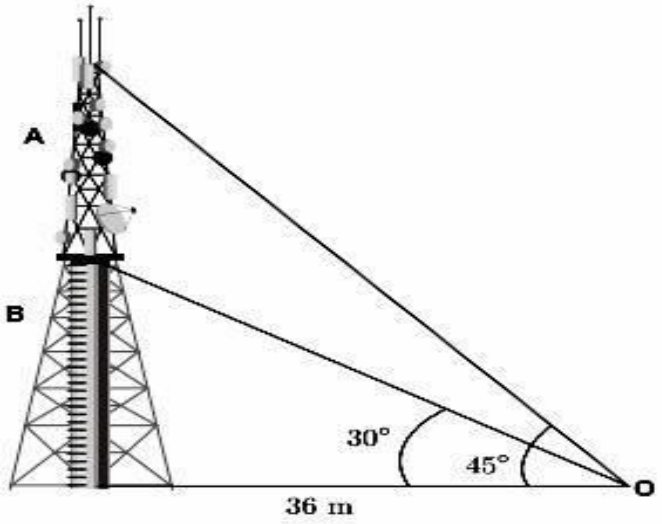
OR

(iii) What is the distance between poles A and C? **(2)**

Q38.

CASE STUDY -3

Radio towers are used for transmitting a range of communication services including radio and television. The tower will either act as an antenna itself or support one or more antennas on its structure, including microwave dishes. They are among the tallest human-made structures. There are 2 main types: guyed and self-supporting structures. On a similar concept, a radio station tower was built in two sections A and B. Tower is supported by wires from a point O. Distance between the base of the tower and point O is 36 m. From point O, the angle of elevation of the top of section B is 30° and the angle of elevation of the top of section A is 45°.



(i) What is the height of the section B? (1)

(ii) What is the height of the section A? (1)

(iii) What is the length of the wire structure from the point O to the top of section A? (2)

	(OR) (iii) What is the length of the wire structure from the point O to the top of section B?	(2)