

KENDRIYA VIDYALAYA SANGATHAN, RAIPUR REGION
SESSION ENDING EXAM (2024-25)

Class: IX

SUBJECT: MATHEMATICS

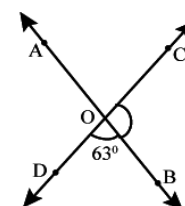
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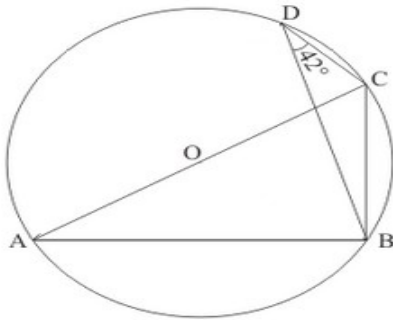
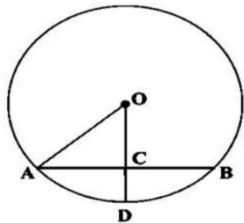
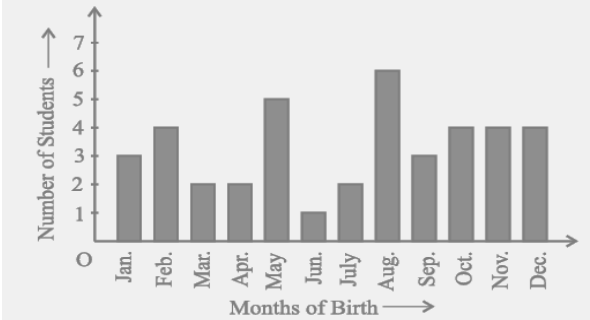
Time: 3 Hrs.

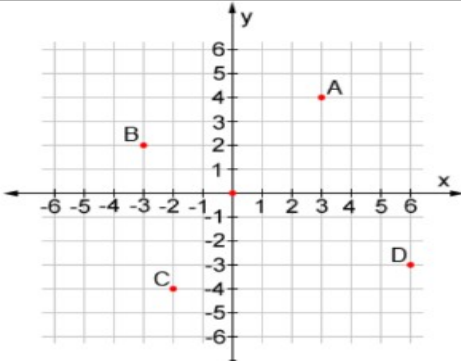
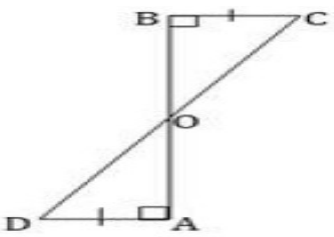
General Instructions:

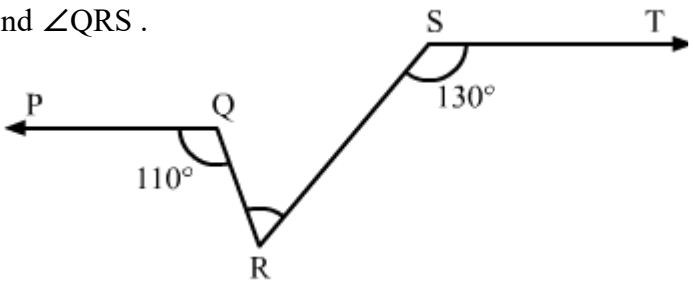
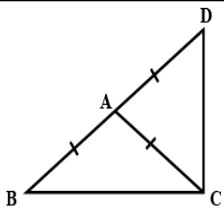
1. This Question Paper has 5 Sections A, B, C, D, and E.
2. Section A has 20 Multiple Choice Questions (MCQs) carrying 1 mark each.
3. Section B has 5 Short Answer-I (SA-I) type questions carrying 2 marks each.
4. Section C has 6 Short Answer-II (SA-II) type questions carrying 3 marks each.
5. Section D has 4 Long Answer (LA) type questions carrying 5 marks each.
6. Section E has 3 Case Based Questions (4 marks each)
7. Draw neat figures wherever required. Take $\pi = 22/7$ wherever required if not stated.

	Section-A
Q.1	Which of the following is a rational number. (A) $\sqrt{223}$ (B) $\sqrt{225}$ (C) 0.303003000.... (D) $\sqrt{2}$
Q.2	The value of k for which $(x+1)$ is a factor of $2x^3 + x^2 - 3x + k$ is (A) 3 (B) 1 (C) -2 (D) -3
Q.3	$x = -1, y = 2$ is not a solution of the following linear equation (A) $x + 2y = 3$ (B) $x - 3y + 7 = 0$ (C) $2x + y = 5$ (D) none of these
Q.4	Which one of the following is a polynomial? (A) $4x^2 - 3x + 7$ (B) $3\sqrt{t} + t\sqrt{2}$ (C) $y + \frac{2}{y}$ (D) $y^{\frac{-1}{2}} + 7$
Q.5	Point $(-3, 5)$ lies in the (A) I quadrant (B) II quadrant (C) III quadrant (D) IV quadrant
Q.6	The perpendicular distance of the point $P(3, 4)$ from the Y-axis is (A) 3 (B) 4 (C) 5 (D) 7
Q.7	Which of the following needs a proof? (A) Theorem (B) Axiom (C) Definition (D) Postulate
Q.8	A circle can be drawn with any centre and any radius is (A) Postulate 1 (B) Postulate 2 (C) Postulate 3 (D) Postulate 4
Q.9	Given $\angle POR = 3x$ and $\angle QOR = 2x + 10$. If POQ is a straight line, then the value of x is (A) 30° (B) 34° (C) 36° (D) None of these
Q.10	Two straight lines AB and CD intersect each other at O. If $\angle BOD = 63^\circ$ then $\angle BOC =$ ----- (A) 63° (B) 117° (C) 17° (D) 153°
Q.11	Which of the following is not true for a parallelogram (A) Opposite sides are equal (B) Opposite angles are equal (C) Opposite angles are bisected by the diagonals (D) Diagonals bisect each other



Q.12	In figure, O is the centre of the circle and $\angle BDC = 42^\circ$. The measure of $\angle ACB$ is (A) 45° (B) 48° (C) 58° (D) 52°	
Q.13	In figure, if $OA = 5$ cm, $AB = 8$ cm and OD is perpendicular to AB, then CD is equal to: (A) 2 cm (B) 3 cm (C) 4 cm (D) 5 cm	
Q.14	The sides of a right triangle are 7cm, 24 cm and 25 cm. Its area is (A) 48 cm^2 (B) 50 cm^2 (C) 84 cm^2 (D) 100 cm^2	
Q.15	If the area of an equilateral triangle is $4\sqrt{3} \text{ cm}^2$. Then its perimeter is (A) 48 cm (B) 24 cm (C) 12 cm (D) 36 cm	
Q.16	Curved surface area of a cone is 308 cm^2 and its slant height is 14 cm. The radius of the base of the cone is: (A) 7 cm (B) 14 cm (C) 16 cm (D) 15 cm	
Q.17	The total number of children born from May to August is: (A) 15 (B) 16 (C) 12 (D) 14	
Q.18	The class mark of the class 90 – 120 is (A) 90 (B) 105 (C) 115 (D) 120	
Q.19	This question consists of two statements, namely, assertion (A) and Reason (R). Assertion (A): Every parallelogram is a rectangle Reason (R): The angle bisectors of a parallelogram form a rectangle. Which of the following is correct? (A) Both Assertion (A) and Reason (R) are true and Reason (R) is a correct explanation of Assertion (A) (B) Both Assertion (A) and Reason (R) are true but Reason (R) is not a correct explanation of Assertion (A) (C) Assertion (A) is true and reason (R) is false. (D) Assertion (A) is false and Reason (R) is true.	
Q.20	This question consists of two statements, namely, assertion (A) and Reason (R). Assertion (A): $\sqrt{3}$ is an irrational number Reason (R): The sum of a rational number and an irrational number is an irrational number Which of the following is correct?	

	(A) Both Assertion (A) and Reason (R) are true and Reason (R) is a correct explanation of Assertion (A) (B) Both Assertion (A) and Reason (R) are true but Reason (R) is not a correct explanation of Assertion (A) (C) Assertion (A) is true and reason (R) is false. (D) Assertion (A) is false and Reason (R) is true.
	Section-B
Q.21	Expand: $(x - 2y + 3z)^2$ [OR] Expand: $\left(3x + \frac{1}{2}\right)^3$
Q.22	Write the coordinates of the points A, B, C and D given in the graph. 
Q.23	AD and BC are equal and perpendicular to a line segment AB. Show that CD bisects AB. 
Q.24	In Fig., if $AC = BD$, then prove that $AB = CD$ 
Q.25	Find the area of triangle, two sides of which are 8 cm, and 11 cm and the perimeter is 32 cm.
	Section-C
Q.26	Find a and b, when $\frac{\sqrt{3}+1}{\sqrt{3}-1} = a - b\sqrt{3}$. OR If $x = 1 + \sqrt{2}$, find the value of $x^2 + \frac{1}{x^2}$.
Q.27	Factorise: $x^3 + 13x^2 + 32x + 20$ [OR] Without finding the cubes factorise: $(x - 2y)^3 + (2y - 3z)^3 + (3z - x)^3$
Q.28	(a) Write the equation $2x + 3y = 4.37$ in the form $ax + by + c = 0$ and indicate the values of a, b and c (b) The cost of a notebook is twice the cost of a pen. Write a linear equation in two variables to represent this statement. (Take the cost of a notebook to be Rs x and that of a pen to be Rs y).

Q.29	If $PQ \parallel ST$, $\angle PQR = 110^\circ$ and $\angle RST = 130^\circ$, Find $\angle QRS$. 
Q.30	In the adjoining figure $\triangle ABC$ is an isosceles triangle in which $AB = AC$. side BA is produced to D such that $AD = AB$. Show that $\angle BCD$ is a right angle. 
Q.31	A conical tent is 10m high and the radius of its base is 24m. Find (i) Slant height of the tent (ii) Cost of the canvas required to make the tent, if the cost of $1 m^2$ canvas is Rs 70. (Use $\pi = 3.14$) [OR] A hemispherical bowl made of brass has inner diameter 10.5cm. Find the cost of tin-plating it on the inside at rate of Rs 16 per $100 cm^2$ (Use $\pi = 3.14$)
Section-D	
Q.32	a) Show that $0.2353535\ldots = 0.23\bar{5}$ can be expressed in the form $\frac{p}{q}$ where p and q are integers and $q \neq 0$. b) Find five rational numbers between $\frac{1}{2}$ and $\frac{1}{3}$
Q.33	Find the five solution of the linear equation $x + 2y = 8$.
Q.34	A dome of a building is in the form of a hemisphere. From inside, it was white- washed at the cost of Rs 4989.60. If the cost of white-washing is Rs 20 per square metre, find the (i) inside surface area of the dome, (ii) volume of the air inside the dome. [OR] Monica has a piece of canvas whose area is $551 m^2$. She uses it to have a conical tent made, with a base radius of 7 m. Assuming that all the stitching margins and the wastage incurred while cutting, amounts to approximately $1 m^2$, find the volume of the tent that can be made with it.
Q.35	Prove that angle subtended by an arc at the centre is double the angle subtended by it at any point on the remaining part of the circle. [OR] Prove that the quadrilateral formed (if possible) by the internal angle bisectors of any quadrilateral is cyclic.
Section-E	
Q.36	Case Study I: Application of parabolas projectile motion: An object which is thrown or projected into the air subject to only the acceleration of gravity is called projectile, and its path is called trajectory. This curved path was shown by Galileo to be a parabola. Parabola is represented by a polynomial. If the polynomial to represent the distance covered is $P(t) = -5t^2 + 40t + 1.2$ (i) What is the degree of the polynomial (a) 0 (b) 1 (c) 2 (d) 3

(ii) On the basis of degree of the polynomial, the polynomial $p(t)$ is classified as

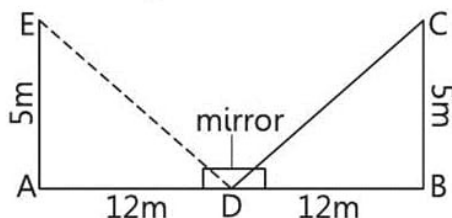
(a) Linear (b) Quadratic (c) cubic (d) Constant

(iii) Find the distance covered by the projectile 4 sec after it is launched.

[OR]

If $P(x) = x^2 - 5x + 6$, find $P(2)$ and $P(3)$

- Q.37 **Case Study II:** John recently read a Mathematics experiment. He was keen to perform it on its own. He chose a long building whose height he want to know, he placed a mirror at ground. He is standing at some distance to the building as well as mirror. John height is 5m and the distance of John from mirror is 12m and distance of building from mirror is also 12m and its height 5m.



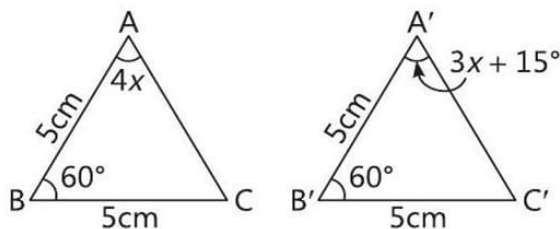
On the basis of the above information, solve the following questions.

Q 1. Write two congruent triangles formed in the given figure.

Q 2. Find the distance between top of building and mirror.

Q 3. Find the area of $\triangle AED$.

Q4. In the given figure below, find the measure of $\angle B'A'C'$.



- Q.38 **Case Study III:** The covid-19 pandemic, also known as the coronavirus pandemic, is an ongoing pandemic of coronavirus disease 2019 (COVID-19) caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). It was first identified in December 2019 Wuhan, China. During survey, the ages of 80 patients infected by COVID and admitted in the one of the city hospitals were recorded and collected data is shown in frequency distribution table.

Age (in years)	No. of patients
5-15	6
15-25	11
25-35	21
35-45	23
45-55	14
55-65	5

(i) Which group was affected the least?

(a) 35 – 45 (b) 25 – 35 (c) 55 – 65 (d) 45 – 55

(ii) Which group was affected the most?

(a) 35 – 45 (b) 25 – 35 (c) 55 – 65 (d) 45 – 55

(iii) How many patients of age 45 years and above were admitted?

[OR]

How many patients of less than age 45 years were admitted?

