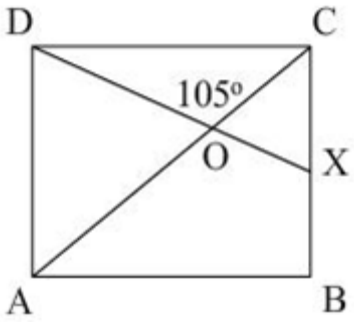
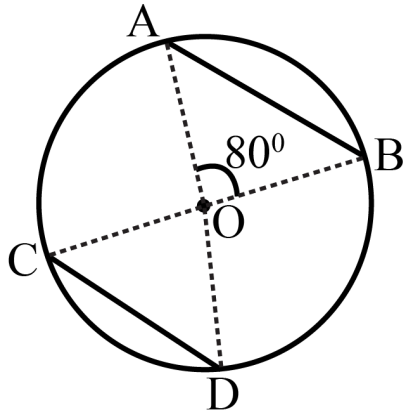
KOTHARI INTERNATIONAL SCHOOL, NOIDA
ANNUAL EXAMINATION, SESSION: 2024-25
GRADE: 9, SUBJECT: MATHEMATICS (041)
SET A

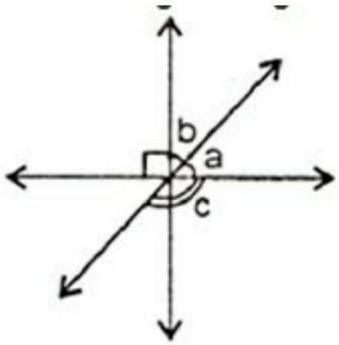
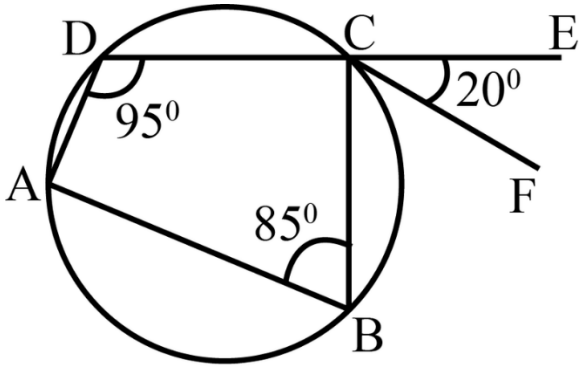
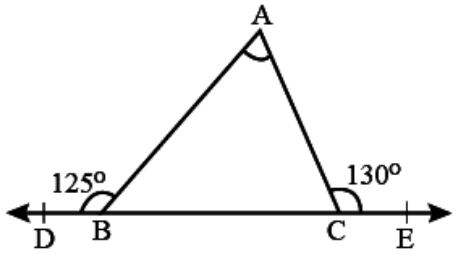
DATE & DAY: 5th Feb 24, Thursday
MAXIMUM MARKS: 80 **TIME ALLOTTED: 3 HOURS**
NAME: _____ **ROLL NUMBER: _____**

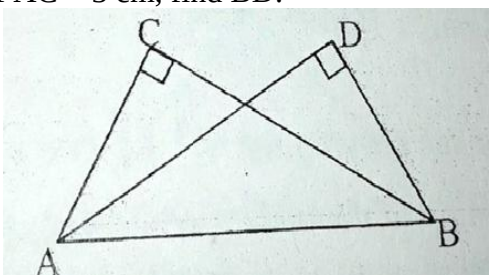
GENERAL INSTRUCTIONS:

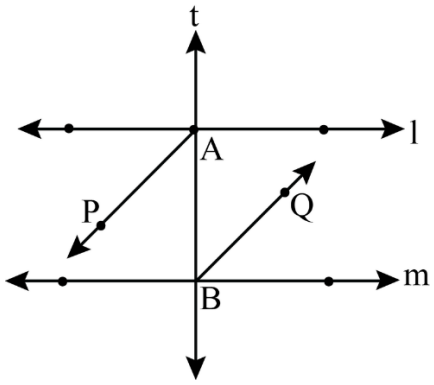
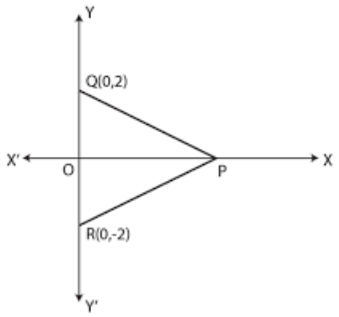
i. *This Question Paper has 5 Sections A-E.*
ii. *Section A has 20 MCQs carrying 1 mark each.*
iii. *Section B has 5 questions carrying 02 marks each.*
iv. *Section C has 6 questions carrying 03 marks each.*
v. *Section D has 4 questions carrying 05 marks each.*
vi. *Section E has 3 case-based integrated units of assessment (04 marks each) with sub-parts of the values of 1, 1 and 2 marks each respectively.*
vii. *All Questions are compulsory. However, internal choice has been provided in each section*
viii. *Draw neat figures wherever required. Take π =22/7 wherever required if not stated.*

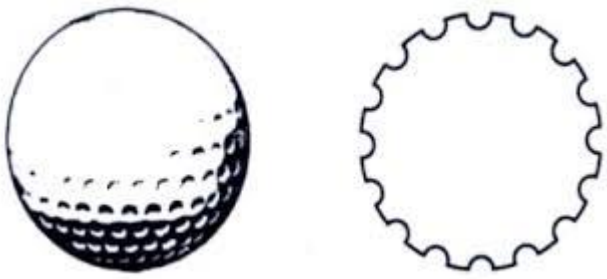
	SECTION – A (20*1 = 20)	Marks
Q1.	If $x + \sqrt{15} = 4$, then find the value of $\frac{1}{x}$ (a) $\frac{1}{4+\sqrt{15}}$ (b) $4 + \sqrt{15}$ (c)$\sqrt{15} - 4$ (d) $\frac{1}{\sqrt{15}-4}$	(1)
Q2.	The value of the polynomial $3x - 2x^2 + 1$, when x = –1 is (a) 4 (b) –2 (c) 0 (d) –4	(1)
Q3.	In a cylinder, if radius is halved and height is doubled, the volume will be (a) same (b) doubled (c) halved (d) four times	(1)
Q4.	The measure of an angle is four times its complement. The angle measure (a) 72^0 (b) 18^0 (c) 36^0 (d) 54^0	(1)
Q5.	The graph of the linear equation 3x+5y=15 cuts the x-axis at the point (a) (5,0) (b) (3,0) (c) (0,5) (d) (0,3)	(1)
Q6.	If $x^2 + px - 20 = (x - 5)(x + 4)$, then the value of 'p' is (a)-3 (b) 2 (c) -1 (d) 3	(1)
Q7.	In the given figure, ABCD is a square. A line segment DX cuts the side BC at X and the diagonal AC at O, such that ∠COD=105^0 and ∠OXC=x. The value of x is	(1)

	 (a) 80^0 (b) 40^0 (c) 60^0 (d) 85^0	
Q8.	Volume of two sphere are in the ratio 64 : 125. The ratio of their surface area is (a) 4 : 5 (b) 16 : 25 (c) 25 : 16 (d) 5 : 4	(1)
Q9.	Which of the following statements is true? (a) √2/3 is a rational number. (b) There are infinitely many integers between two integers. (c) Number of rational numbers between 15 and 18 is finite. (d) There are numbers which cannot be written in the form of p/q, q≠0, p, q both are integers.	(1)
Q10.	The point which lies on y-axis at a distance of 4 units in the negative direction of y-axis is (a) (4, 0) (b) (-4, 0) (c) (0,4) (d) (0,-4)	(1)
Q11.	AB and CD are two equal chords of a circle with centre O such that ∠AOB = 80°, then ∠COD =?  (a) 80^0 (b) 40^0 (c) 100^0 (d) 120^0	(1)
Q12.	The class-mark of the class 150-170 is (a) 150 (b) 165 (c) 160 (d) 155	(1)
Q13.	If the perimeter of an equilateral triangle is 60 m, then the area is (a) $13\sqrt{3}$ m^2 (b) $15\sqrt{3}$ m^2 (c) $20\sqrt{3}$ m^2 (d) $100\sqrt{3}$ m^2	(1)
Q14.	The expression $(a-b)^3+(b-c)^3+(c-a)^3$ (a)$(a-b)(b-c)(c-a)$ (b) $3(a-b)(b-c)(c-a)$	(1)

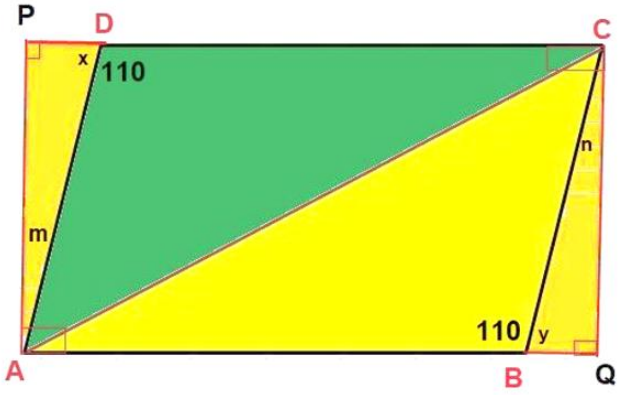
	(c) $-3(a-b)(b-c)(c-a)$ (d) $(a+b+c)(a^2+b^2+c^2-ab-bc-ca)$	
Q15.	In the given figures, if the angles a and b are in the ratio 3:2, then angle c is  (a) 90 (b) 126 (c) 144 (d) None of these	(1)
Q16.	In the given figure, ABCD is a cyclic quadrilateral in which DC is produced to E and CF is drawn parallel to AB such that ∠ADC = 95° and ∠ECF = 20°. Then ∠BAD =  (a) 75° (b) 85° (c) 95° (d) 105°	(1)
Q17.	x=-5, y=2 is a solution of the linear equation (a) 2x+y=9 (b) 2x-y=12 (c) x+3y=1 (d) x+3y=0	(1)
Q18.	Side BC of ΔABC has been produced to D on left and to E on right-hand side of BC such that ∠ABD = 125° and ∠ACE = 130°. Then, ∠A =?  (a) 75° (b) 55° (c) 50° (d) 65°	(1)
	Questions number 19 and 20 are Assertion and Reason based questions carrying 1 mark each. 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 the Assertion (A).	

	(b) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of the Assertion (A). (c) Assertion (A) is true, but Reason (R) is false. (d) Assertion (A) is false, but Reason (R) is true.	
Q19.	**Assertion (A):** If the side BC of triangle ABC is produced to D, then ∠ACD=∠A+∠B. **Reason (R):** Exterior angle is the sum of two interior angles.	(1)
Q20.	**Assertion (A):** The sides of a triangle are 3 cm, 4 cm and 5 cm. Its area is 6 cm^2. **Reason (R):** If s = (a + b + c), where a, b, c are the sides of a triangle, then area =.$\sqrt{s(s-a)(s-b)(s-c)}$	(1)
	SECTION – B (5 * 2= 10)	
Q21.	A chord of a circle is equal to the radius of the circle. Find the angle subtended by the chord at a point on the minor arc and also at a point on the major arc.	(2)
Q22.	In the given figure PR= QS, then which of the following axioms shows that PQ= RS?  	(2)
Q23.	ΔACB and ΔADB are two congruent right – angled triangles on the same base AB = 6 cm as shown in figure. If AC = 3 cm, find BD.  **OR** In ΔABC, 2∠A=3∠B=6∠C. Find ∠A, ∠B and ∠C.	(2)
Q24.	In a parallelogram, show that the angle bisector of two adjacent angles intersect at right angles.	(2)
Q25.	The height of a cone is 15 cm. If its volume is 1570 cm^3, find the radius of the base. (Use π = 3.14) **OR** If the radius of the sphere is doubled. Find the ratio of volume of the new sphere to the original sphere.	(2)
	SECTION – C (6*3 = 18)	

Q26.	Factorise: $(x+2)^2 + p^2 + 2p(x+2)$ **OR** If $2x + 3y = 12$ and xy=6, find the value of $8x^3 + 27y^3$.	(3)
Q27.	In the given figure, AP and BQ are the bisectors of the two alternate interior angles formed by the intersection of a transversal t with parallel lines l and m. Show that AP ‖ BQ.  	(3)
Q28.	Simplify the following: $$\frac{4}{(216)^{-\frac{2}{3}}} + \frac{1}{(256)^{\frac{-3}{4}}} + \frac{2}{(243)^{-\frac{1}{5}}}$$ **OR** $$\left(\frac{81}{16}\right)^{-3/4} \times \left[\left(\frac{25}{16}\right)^{-3/2} \div \left(\frac{5}{2}\right)^{-3}\right]$$	(3)
Q29.	In the given figure, ΔPQR is equilateral. If the coordinates of the points Q and R are (0,2) and (0,−2) respectively, find the coordinates of the point P.  	(3)
Q30.	When a number is divided by another the quotient and remainder obtained are 9 and 1. Express this information in the form ax+by+c=0 Also write the value of a, b and c.	(3)
Q31.	Find the area of an isosceles triangle whose one side is 10 cm greater than each of its equal sides and the perimeter is 100 cm.	(3)
	SECTION – D (4 * 5 = 20)	

Q32.	A random survey of the number of children of various age group playing in a park was found as follows: Draw a histogram to represent the data above.	(5)
Q33.	In a right triangle, prove that the line-segment joining the mid-point of the hypotenuse to the opposite vertex is half the hypotenuse.	(5)
Q34.	Three girls Aditi, Priya and Puja are playing a game by standing on a circle of radius 5 cm drawn in the park. Aditi throws a ball to Priya, Priya to Puja, Puja to Aditi. If the distance between Priya and Aditi, and between Priya and Puja is 6 cm each. What is the distance between Aditi and Puja? **OR** Prove that the quadrilateral formed by the internal angle bisectors of any quadrilateral is cyclic.	(5)
Q35.	Factorise: $\frac{1}{27}(2x+5y)^3+\left(\frac{-5y}{3}+\frac{3z}{4}\right)^3+\left(-\frac{3z}{4}+\frac{2x}{3}\right)^3$ **OR** x^3-3x^2-9x-5	(5)
	SECTION-E (3 * 4 =12)	
Q36.	**Read the text carefully and answer the question:** A golf ball is spherical with about 300 - 500 dimples that help increase its velocity while in play. Golf balls are traditionally white but available in colours also. In the given figure, a golf ball has diameter 4.2 cm and the surface has 315 dimples (hemi-spherical) of radius 2 mm.  (a) Find the surface area of one such dimple? (1) (b) Find the volume of the material dug out to make one dimple? (1) (c) Find the total surface area exposed to the surroundings?	 (1) (1) (2)

Age (in years)	1–2	2–3	3–5	5–7	7–10	10–15	15–17
Number of children	5	3	6	12	9	10	4

	OR Find the volume of the golf ball?	
Q37.	**Read the text carefully and answer the question:** Ruchi lives in an undeveloped area where there is no facility of proper education. But one thing is available in that area i. e, network. Since she was very keen to take education, so she decided to complete her education through e-leaming. One day she was studying number system, where she learnt about rational numbers, irrational numbers and decimal numbers, etc. On the basis of the above information, solve the following questions:  (i) Convert the rational number 2/15 into decimal number. (ii) Write one irrational number between 2.365 and 3.125. (iii)If $x+\sqrt{2}=3$ then find the value of $1/x$ **OR** Find the product of two irrational number $(5+2\sqrt{7})\ (2+5\sqrt{7})$	(1) (1) (2)
Q38.	In the middle of the city, there was a park ABCD in the form of a parallelogram form so that AB = CD, AB||CD and AD = BC, AD || BC. Municipality converted this park into a rectangular form by adding land in the form of APD and the triangular shape of land were covered by planting flower plants.  (i) Show that ΔAPD and ΔBQC are congruent. (ii) PD is equal to which side? (iii) Show that ΔABC and ΔCDA are congruent. **OR** What is the value of ∠m?	(1) (1) (2)