



IDEAL INDIAN SCHOOL, DOHA- QATAR
ANNUAL EXAMINATION, FEBRUARY 2024
MATHEMATICS (041)

CLASS: IX
Date: 04.02.2024

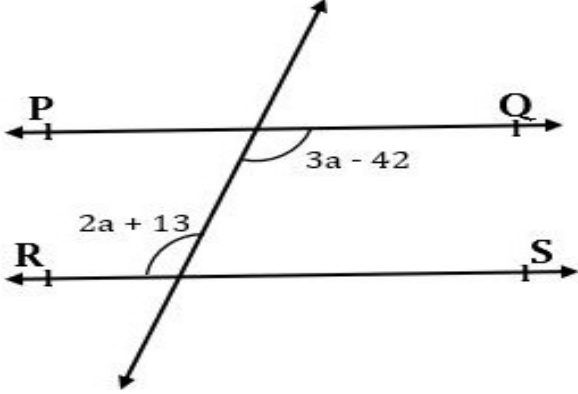
SET 1

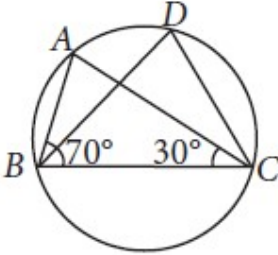
Max Marks:80
Duration : 3 hours

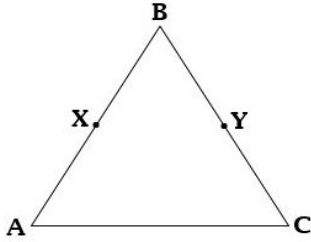
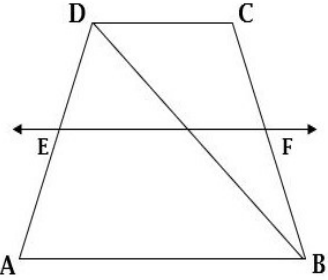
General Instructions:

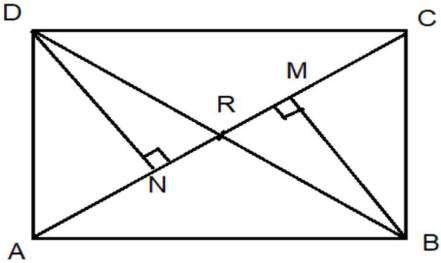
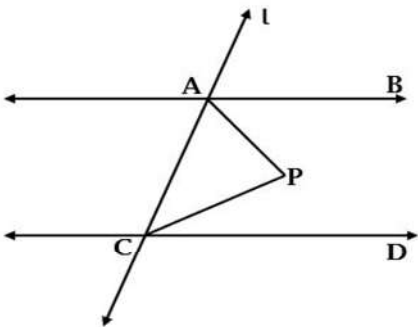
1. This Question Paper has 5 Sections A-E.
2. Section A has 20 MCQs carrying 1 mark each
3. Section B has 5 questions carrying 02 marks each.
4. Section C has 6 questions carrying 03 marks each.
5. Section D has 4 questions carrying 05 marks each.
6. Section E has 3 case based integrated units of assessment (04 marks each) with sub-parts of the values of 1, 1 and 2 marks each respectively.
7. All Questions are compulsory. However, an internal choice in 2 Questions of 5 marks, 2 Questions of 3 marks and 2 Questions of 2 marks has been provided. An internal choice has been provided in the 2 marks questions of Section E.
8. Draw neat figures wherever required. Take $\pi = \frac{22}{7}$ wherever required if not stated.

Q.No	SECTION – A	Marks
	Section A consists of 20 questions of 1 mark each.	
1	After rationalising the denominator of $\frac{7}{3\sqrt{3}-2\sqrt{2}}$, we get the denominator as (a) 13 (b) 19 (c) 5 (d) 35	1
2	What is the degree of the polynomial $\sqrt{3}$? (a) 1 (b) 0 (c) 3 (d) $\frac{1}{2}$	1
3	If $a + b + c = 0$, then $a^3 + b^3 + c^3$ is equal to (a) 3abc (b) abc (c) 0 (d) 2 abc	1
4	In a parallelogram ABCD, if $\angle A = 2x + 15^\circ$, $\angle B = 3x - 25^\circ$, then the value of x is (a) 91° (b) 89° (c) 34° (d) 38°	1
5	The value of $7\sqrt{45} \div 3\sqrt{5}$ is (a) 2 (b) $\frac{7}{3}$ (c) 7 (d) $7\sqrt{3}$	1

6	<p>In a histogram, which of the following is proportional to the frequency of the corresponding class?</p> <p>(a) width of the rectangle (b) length of the rectangle (c) perimeter of the rectangle (d) area of the rectangle</p>	1
7	<p>Zero of the polynomial $P(x) = 2x + 5$ is</p> <p>(a) $\frac{2}{5}$ (b) $-\frac{2}{5}$ (c) $-\frac{5}{2}$ (d) $\frac{5}{2}$</p>	1
8	<p>The linear equation $3x - 2y = 10$ has</p> <p>(a) unique solution (b) infinitely many solutions (c) no solution (d) two solutions</p>	1
9	<p>In the given figure, if $PQ \parallel RS$ find the value of a.</p> <div style="text-align: center;">  </div> <p>(a) 28° (b) 40° (c) 56° (d) 55°</p>	1
10	<p>In triangles ABC and PQR, $AB = PQ$ and $\angle B = \angle Q$. The two triangles will be congruent by SAS axiom if</p> <p>(a) $BC = QR$ (b) $AB = QR$ (c) $AC = PR$ (d) $\angle C = \angle R$</p>	1
11	<p>If $P(x) = x^2 - 2\sqrt{2}x + 1$, then $P(2\sqrt{2})$ is equal to</p> <p>(a) 0 (b) 1 (c) $4\sqrt{2}$ (d) $8\sqrt{2} + 1$</p>	1
12	<p>The angle which is one fourth of its complement is</p> <p>(a) 15° (b) 18° (c) 45° (d) 60°</p>	1
13	<p>The number of dimensions, a solid has</p> <p>(a) 3 (b) 0 (c) 1 (d) 2</p>	1

14	<p>If the diagonals of a quadrilateral bisect each other at right angles, then the quadrilateral is a</p> <p>(a) rectangle (b) parallelogram (c) trapezium (d) rhombus</p>	1
15.	<p>The length of a chord AB which is at a distance of 6cm from the centre O of a circle having radius 10cm is</p> <p>(a) 8cm (b) 4cm (c) 16cm (d) 12cm</p>	1
16	<p>Which of the following is not a solution of $2x - 3y = 12$?</p> <p>(a) (0, -4) (b) (6,0) (c) (2,3) (d) (3,-2)</p>	1
17	<p>A joker's cap is in the form of a right circular cone of base diameter 14cm and the slant height 25cm , then the area of sheet required to make 2 such caps is</p> <p>(a) $1100cm^2$ (b) $1000cm^2$ (c) $550cm^2$ (d) $5500cm^2$</p>	1
18	<p>The slant height of a cone is 13cm and the base radius is 5cm, then the height of the cone is</p> <p>(a) 12cm (b) 8cm (c) 10cm (d) 18cm</p>	1
19	<p>DIRECTION: In the questions 19 and 20, a statement of assertion (A) is followed by a statement of Reason (R). Choose the correct option.</p> <p>Assertion: In the given figure, $\angle ABC = 70^\circ$ and $\angle ACB = 30^\circ$. Then, $\angle BDC = 80^\circ$. Reason: Angles in the same segment of a circle are equal.</p> <div style="text-align: center;">  </div> <p>(a) Both assertion and reason are true and reason is the correct explanation of assertion (b) Both assertion and reason are true and reason is not the correct explanation of assertion. (c) Assertion is true but reason is false. (d) Assertion is false but reason is true.</p>	1

20	<p>Assertion: The area of an equilateral triangle having side $4\sqrt{3}\text{cm}$ is 48cm^2</p> <p>Reason: The area of an equilateral triangle having each side a is $\frac{\sqrt{3}}{4}a^2$ square units.</p> <p>a) Both assertion and reason are correct and reason is the correct explanation for assertion.</p> <p>b) Both assertion and reason are correct and reason is not the correct explanation for assertion.</p> <p>c) Assertion is true but the reason is false.</p> <p>d) Assertion is false and reason is true.</p>	1
SECTION B		
Section B consists of 5 questions of 2 marks each		
21	If $x + 1$ is a factor of $ax^3 + x^2 - 2x + 4a - 9$, find the value of a .	2
22	If the point $(2k - 1, k)$ is a solution of the equation $10x - 9y = 12$, then find the value of k .	2
23	<p>In the given figure, if $AB = BC$ and $BX = BY$. Show that $AX = CY$.</p> <p style="text-align: center;">OR</p> <p>State any two Euclid's axioms.</p>	
24	<p>ABCD is a rectangle in which $AB \parallel DC$. BD is a diagonal and E is the midpoint of AD. A line drawn through E parallel to AB intersecting BC at F. Show that F is the midpoint of BC.</p>	
25	<p>The cost of 5 pens is same as the cost of two note books. Express this statement as a linear equation in two variables.</p> <p style="text-align: center;">OR</p> <p>Express the linear equation $y = 2x + 3$ in the standard form. Find the values of a, b and c. Also find one solution.</p>	2

SECTION C		
Section C consists of 6 questions of 3 marks each		
26	<p>Find the area of a triangle whose sides are 80cm, 48cm, and 64cm. Also find the altitude corresponding to the side of length 64cm.</p> <p style="text-align: center;">OR</p> <p>The perimeter of a triangular field is 450m and its sides are in the ratio 13:12:5. Find the area of the triangle.</p>	3
27	<p>In the figure given, BM and DN are both perpendiculars to AC and BM = DN. Prove that AC bisects BD.</p> <p style="text-align: center;">OR</p> <p>ABCD is a rhombus and P, Q, R and S are mid-points of the sides AB, BC, CD and DA respectively. Show that the quadrilateral PQRS is a rectangle</p>	 3
28	Represent $\sqrt{7.5}$ on the number line.	3
29	<p>In the figure, $AB \parallel CD$ and a transversal l cuts AB and CD at A and C respectively. Bisectors of $\angle A$ and $\angle C$ intersect each other at P. Prove that $\angle APC = 90^\circ$.</p>	 3
30	<p>A hemispherical dome of a building is to be whitewashed and the total cost of whitewashing the dome is Rs 924 at the rate of Rs 3 per m^2, then find the</p> <p>(i) inside surface area of the dome,</p> <p>(ii) volume of the air inside the dome.</p>	3
31	If $a + b + c = 6$ and $a^2 + b^2 + c^2 = 14$, find the value of $ab + bc + ca$.	3

SECTION D		
Section D consists of 4 questions of 5 marks each		
32	<p>i) Find a and b, if $\frac{7+4\sqrt{5}}{7-4\sqrt{5}} = a + \sqrt{5} b$.</p> <p>ii) Express 0.47777..... in the form $\frac{p}{q}$ where p and q are integers and $q \neq 0$.</p> <p style="text-align: center;">OR</p> <p>If $x = \frac{\sqrt{5}+1}{\sqrt{5}-1}$ and $y = \frac{\sqrt{5}-1}{\sqrt{5}+1}$, then find the value of $x^2 + y^2$.</p>	5
33	<p>i) Prove that the 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.</p> <p>ii) In the given figure O is the centre of the circle. Find the values of x and y.</p> <div style="text-align: center;"> </div>	5
34	<p>Factorise completely: $2x^3 - 3x^2 - 17x + 30$.</p> <p style="text-align: center;">OR</p> <p>Factorise using suitable identity :</p> <p>(i) $64a^3 - 27b^3 - 144a^2b + 108ab^2$</p> <p>(ii) $250x^3 - 432y^3$.</p>	5

35	The number of workers in various age groups of an organization is given below. Draw a frequency polygon to represent the given data.						5
	AGE GROUP	20 - 25	25 -30	30 -35	35- 40	40- 45	
	NUMBER OF WORKERS	9	6	15	3	8	9

SECTION E

Case study-based Questions are compulsory

36 In Agra in a grinding mill, there were installed 5 types of mills. These mills used steel balls of radius 3.5mm, 7mm, 10mm, 14mm and 16mm respectively. All the balls were in the spherical shape. For repairing purpose mills need 12 balls of 7mm radius and 15 balls of 3.5mm radius. The workshop was having 20000mm^3 steel. This 20000mm^3 steel was melted and 12balls of 7mm radius and 15 balls of 3.5mm radius were made and the remaining steel was stored for future use.

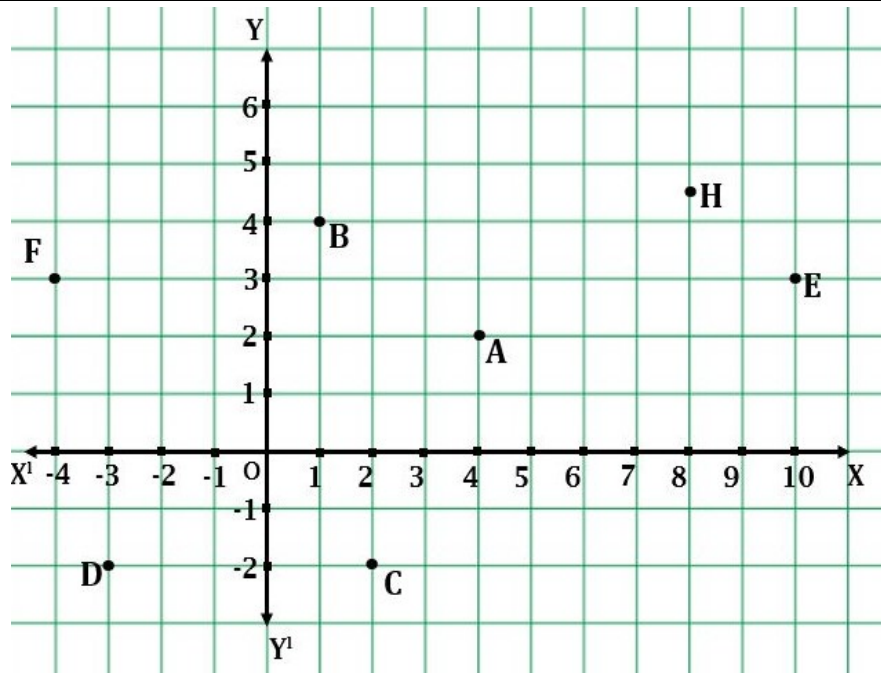
(i) Write the formula to find the surface area of sphere.
(ii) What was the surface area of one ball of 3.5mm radius?
(iii) What was the volume of 12 balls of radius 7mm?

OR

How much steel was kept for future use?

1
1
2

37 Sports in schools have immense benefits for both children and for educational systems. The benefits can be presented in terms of children’s development in a number of domains: physical, lifestyle, affective, social, and cognitive so every school provides a playground and sport activities to the students. Rita is a good sports person and takes part in sport activities. The positions of different students in the playground are represented by different points in Cartesian plane as shown in the graph given below:



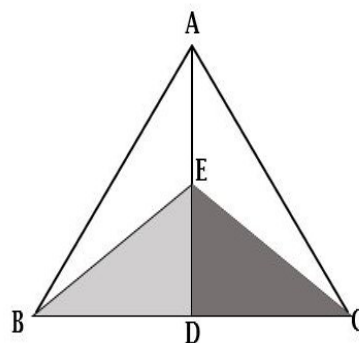
- i) What are the co-ordinates of point B?
- ii) In which Quadrant does the point F lie?
- iii) Find the distance between the points C and D.

1
1
2

OR

Find the value of (abscissa of H – ordinate of D) .

38 Rangoli is an art form that originates from the Indian subcontinent, in which patterns are created on the floor or tabletop using materials such as powdered lime stone, red ochre, dry rice flour, coloured sand, quartz powder, flower petals, and coloured rocks. During a Diwali festival Ananya made a geometrical Rangoli as shown below:



On measuring the dimensions, it was found that AB and AC were equal and BE and CE were also equal.

- i) Which side is common in triangles AEB and AEC ?
- ii) Are triangles ABE and ACE congruent? Why?
- iii) Show that $\angle BED = \angle CED$.

1
1
2

OR

Write the RHS Congruence Rule.
