

ANNUAL EXAMINATION 2023-24

MATHEMATICS

Time : 3 hrs.]

Class IX

[M.M. : 80

General Instructions—

- (i) The question paper has 5 sections A, B, C, D and E.
- (ii) Section A has 20 MCQs carrying 1 mark each.
- (iii) Section B has 5 questions carrying 2 marks each.
- (iv) Section C has 6 questions carrying 3 marks each.
- (v) Section D has 4 questions carrying 5 marks each.
- (vi) Section E has 3 base integrated units of assessment (4 marks) each with sub parts of the values of 1, 1 and 2 marks each respectively.
- (vii) Draw figures wherever necessary.
- (viii) Write the serial number of questions before attempting it.

SECTION-A

1×20=20

1. Identify the p/q form of $0.\bar{7}$:

(a) $\frac{7}{9}$

(b) $\frac{9}{7}$

(c) $\frac{7}{10}$

(d) None of these

2. Identify the polynomial from the given expressions :

(a) $x^2 + 5\sqrt{x} + 2$

(b) $3x^2 + 2x - 5$

(c) $(x)^{-2}$

(d) $1/x$

3. The coordinates of the point which lies on the y axis at a distance of 5 units from the origin in the positive direction of the y axis :

(a) (5, 0)

(b) (5, 5)

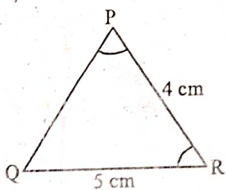
(c) (0, 5)

(d) (0, -5)

P. T. O.

[2]

4. Which of the following is not a linear equation in 2 variables :
 (a) $ax+by=5$ (b) $3m+2n-6=0$
 (c) $3x^2=48$ (d) $2p+3q=8$
5. All right angles are equal to one another. Identify the Euclid's postulate :
 (a) Postulate 4 (b) Postulate 1
 (c) Postulate 3 (d) Postulate 5
6. Name the type of angle whose measure lies between 180° and 360° :
 (a) Complete angle (b) Reflex angle
 (c) Obtuse angle (d) Straight angle
7. In $\triangle PQR$, $\angle P = \angle R$, $QR = 5$ cm, $PR = 4$ cm, the length of PQ is _____.



- (a) 4 cm (b) 2 cm
 (c) 5 cm (d) 2.5 cm
8. The sum of consecutive angles of a parallelogram is always :
 (a) 180° (b) 270°
 (c) 360° (d) 90°
9. Volume of a sphere whose diameter is 6 cm :
 (a) 36π cm³ (b) 288π cm³
 (c) 108π cm³ (d) None of these
10. Three angles of a quadrilateral are equal and the fourth angle measures 120° . Find the measure of each of the equal angle :
 (a) 70° (b) 100°
 (c) 60° (d) 80°

[3]

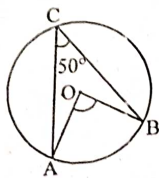
Maths IX/MG-330

11. The sides of a right angled triangle is 6 cm, 8 cm and 10 cm. Find its area.
 (a) 24 cm² (b) 48 cm²
 (c) 96 cm² (d) 40 cm²
12. Curved surface area of a cone can be calculated using the formula :
 (a) $2\pi rl$ (b) πrl
 (c) $\pi r(l+r)$ (d) πr^2
13. Range of the data is _____
 25, 18, 22, 50, 8, 11, 32
 (a) 14 (b) 25
 (c) 50 (d) 42
14. Value of $(49)^{1/3} \times (7)^{1/3}$:
 (a) 7 (b) 49
 (c) 14 (d) 21
15. Perpendicular distance of the point $(-5, 2)$ from the x axis :
 (a) 2 units (b) 5 units
 (c) 3 units (d) None of these
16. Zero of the polynomial $p(x) = cx+d$; $c \neq 0$; 'c' and 'd' are real number :
 (a) $\left(\frac{-c}{d}\right)$ (b) $\left(\frac{-d}{c}\right)$
 (c) $\frac{c}{d}$ (d) $\frac{d}{c}$
17. No. of solutions of a linear equation in 2 variables :
 (a) 2 (b) 1
 (c) 0 (d) infinitely many
18. Which of the following needs a proof ?
 (a) Axiom (b) Theorem
 (c) Postulates (d) Definition

Assertion & Reason :

Direction : In each of the following questions (Q.19 and Q.20), a statement of Assertion is given followed by a corresponding statement of Reason just below it. Of the statements, mark the correct answer as :

- (a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion.
 - (b) Both Assertion and Reason are true but Reason is not the correct explanation of Assertion.
 - (c) Assertion is true but Reason is false.
 - (d) Assertion is false but Reason is true.
19. **Assertion :** If $(x+1)$ is a factor of x^3+1 , then $P(-1) = 0$ (a)
Reason : If $P(x)$ is a polynomial of degree $n \geq 1$ and a is any real number, then $(x+a)$ is a factor if $P(-a) = 0$.
20. **Assertion :** In the given figure, O is the centre of the circle. If $\angle ACB = 50^\circ$ then $\angle AOB = 100^\circ$. (c)



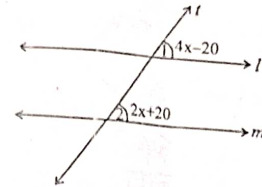
Reason : Perpendicular from the centre of a circle bisects the chord.

SECTION-B

(Section B consists of 5 questions of 2 marks each.)

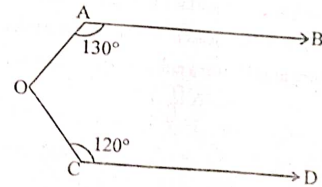
- 21. Convert $2\overline{35}$ to the form of a rational number.
- 22. Write the mirror image of :
 - (a) $(8, -5)$ along the x-axis.
 - (b) $(3, 4)$ along the y-axis.

- 23. Three sides of a scalene triangle are 40 cm, 32 cm and 24 cm. Find its area.
- 24. Find the diameter of a cone whose height and slant height are 12 cm and 20 cm respectively.
- 25. l and m are 2 parallel lines and 't' is a transversal. Find the measures of $\angle 1$ and $\angle 2$. Using the properties of angles.



OR

In the given figure $AB \parallel CD$, find the measure of $\angle AOC$.



SECTION-C

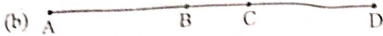
(Section C consists of 6 questions of 3 marks each.)

- 26. Factorise the following using appropriate identities :
 - (a) $27a^3 - 125b^3$
 - (b) $4x^2 + 9y^2 + 16z^2 + 12xy - 24yz - 16xz$

OR

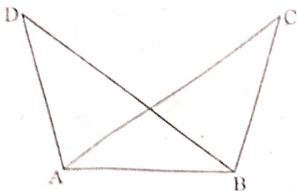
Using factor theorem, determine whether $(x+2)$ is a factor of $2x^3 + x^2 - 2x + 8$.

27 (a) Mention any 2 Euclid's axioms.



In the given figure, if $AC = BD$ then prove that $AB = CD$. Mention the axiom used.

28. In the given figure $AD = BC$ and $\angle DAB = \angle CBA$, prove that

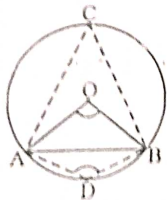


(a) $\triangle ABD \cong \triangle BAC$

(b) $BD = AC$

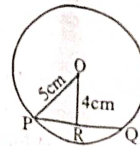
Give reason for every statement.

29. In the given figure, OA and OB are the radii of the circle. Chord AB is equal to the radius of the circle. Find the measure of the angle subtended by the chord at a point on the minor arc and also at a point on the major arc.



OR

PQ is a chord of a circle with centre O and radius 5 cm. OR is perpendicular to PQ . If the length of $OR = 4$ cm, then find the length of the chord PQ .



30. Curved surface area of a conical tent is 550 m^2 and its radius is 7 m.

Find the following :

(a) slant height

(b) height of the tent

(c) volume of the conical tent

OR

The diameter of a metallic ball is 4.2 cm. Find the mass of the ball, if the density of the metal is 8.9 g per cm^3 .

31. (a) Find two solutions of the linear equation :

$$4x + y = 12$$

(b) Check whether $(4, 0)$ is a solution of the linear equation :

$$x - 2y = 4$$

SECTION-D

(Section D consists of 4 questions of 5 marks each)

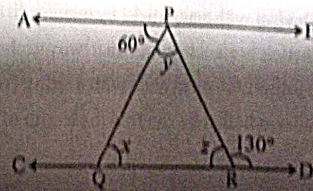
32. Evaluate using identities (Also mention the identities) :

(a) $(102)^3$

(b) 104×96

(c) Without calculating the cubes, find the value of $(-15)^3 + (10)^3 + (5)^3$

33. (a) In the given figure $AB \parallel CD$.



$\angle APQ = 60^\circ$ and $\angle PRD = 130^\circ$ Find the values of x, y and z .

Mention the property used.

(b) Prove that if two lines intersect each other, then the vertically opposite angles are equal.

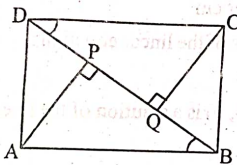
34. Marks obtained by a few students in an examination are given below. Draw a histogram to represent the given information.

Marks	0-20	20-40	40-60	60-80	80-100
No. of students	10	15	40	45	40

- (i) How many students got marks more than or equal to 60 ?
 (ii) Find the class mark of the class interval with highest frequency.

35. (a) State and prove mid point theorem.

(b) ABCD is a parallelogram. AP and CQ are perpendiculars from the vertices A and C.



Prove that $\triangle APB \cong \triangle CQD$

OR

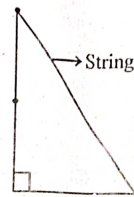
ABCD is a Rhombus. P, Q, R & S are the mid points of the sides AB, BC, CD, and DA respectively. Show that the quadrilateral PQRS is a rectangle.

SECTION-E

(Case study based questions)

36. Sam and Max are playing with matchsticks by making different figures from them. Sam kept one matchstick horizontally and then two matchsticks vertically as shown in the figure. Max joined the open ends with a string (refer to the figure). They ask their elder brother whether he can find the length of this string.

He replied, length of this string can be calculated using Pythagoras theorem and it is equal to $\sqrt{2^2 + 1^2} = \sqrt{4 + 1} = \sqrt{5}$



On the basis of the above information, answer the following questions :

(i) Mention whether Rational or irrational number :

(a) $\frac{\sqrt{20}}{\sqrt{5}}$

(b) $\frac{7}{\sqrt{5}}$

(ii) Simplify :

$3\sqrt{5} + 4\sqrt{5} - \sqrt{5}$

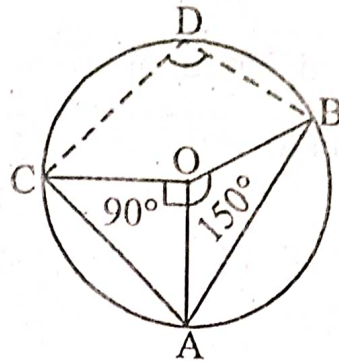
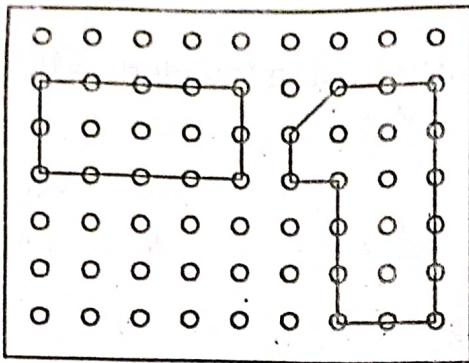
(iii) Rationalise the denominator :

$\frac{1}{(3\sqrt{5} + 5)}$

OR

Represent $\sqrt{5}$ on a number line.

37. A circular Geoboard is a mathematical manipulative used to explore the basic concept of the plane Geometry. It has 24 numbers of equally spaced pegs arranged on two different circles and one peg at the centre. It is also used to explore circle related theorem with the help of a rubber band. During the practical activity in mathematic lab, student find that two rubber band in between A and B and in between A and C subtends angle equal to 90° and 150° respectively at the centre 'O' as shown in figure.

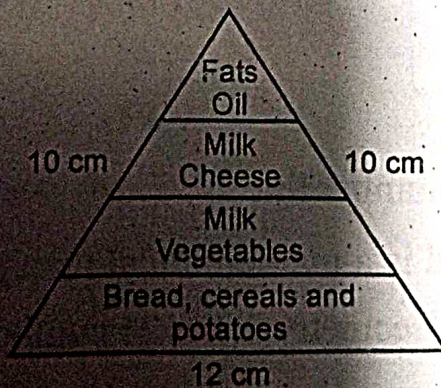


Based on the above information, answer the following questions :

- Find the measures of $\angle BOC$ and $\angle BAC$.
- What is the measures of $\angle BDC$ (mention the property/Theorem used)
- What are the measures of $\angle OAB$ and $\angle OBA$ are they equal? Justify your answer.

38. FOOD PYRAMID

A food pyramid is a representation of the optimal number of servings to be eaten each day from each of basic food groups. It is designed to make healthy eating easier. Health care NGO in India working for underprivileged children. In rural areas health statistics are continue to poor. In this direction Health Care India has made the children under the age of 13 aware of "food pyramid" by telling the importance of different food groups such as carbohydrates, fats, vitamins, proteins, minerals etc. The models of food pyramid which they have used triangle with sides 10 cm, 10 cm and 12 cm.



Based on the above information, answer the following questions :

- Find the semi perimeter of the given triangle. 16 cm
- Find the area of the food pyramid which is in the shape of triangle. 60 cm^2
- What will be the area of the triangle of all the sides are 10 cm each. $100\frac{\sqrt{3}}{4}\text{ cm}^2$