

FINAL EXAMINATION : 2023-24

Date : 23/02/2024

CLASS : IX

Max. Marks : 80

Time : 3 hrs.

SUBJECT : MATHEMATICS

No. of Pages : 07

Name: _____ Roll No _____ Class _____ Sec _____

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 Qs of 5 marks, 2 Qs of 3 marks and 2 Questions of 2 marks has been provided. An internal choice has been provided in the 2marks questions of Section E
8. Draw neat figures wherever required. Take $\pi = 22/7$ wherever required if not stated.

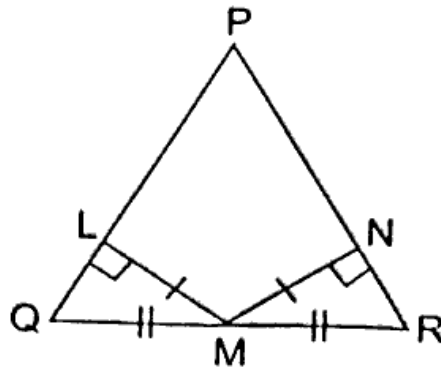
SECTION - A (1x20=20)

Multiple choice questions-

- Q1. Let x and y be rational and irrational number respectively. Then $x + y$ is necessarily
- (a) a whole number (b) a rational number
(c) an irrational number (d) a natural number
- Q2. The rational number $0.\overline{3}$ can also be written as
- (a) 3 (b) $\frac{3}{10}$
(c) 0.33 (d) $\frac{1}{3}$
- Q3. Given a polynomial $p(t) = t^4 - t^3 + t^2 + 6$, then $p(-1)$ is
- (a) 3 (b) 6
(c) 9 (d) -1
- ★ Q4. A point $P(a, b)$ is such that: $a < 0, b > 0$. In which quadrant does the point P lie?
- (a) First Quadrant (b) ~~First~~ Second Quadrant
(c) Third Quadrant (d) Fourth Quadrant
- ★ Q5. In a continuous frequency distribution, class mark of a class is 85 and lower class limit is 83, then its upper class limit is
- (a) 86 (b) 84
(c) 83 (d) ~~83~~ 87

- ★ Q6. Total surface area of right circular cone of base diameter $2r$ and slant height l is equal to
 (a) $\pi r^2 + \pi r l$ (b) $\pi r + \pi r l^2$
 (c) $2\pi r^2$ (d) $2\pi r l$
- Q7. If volume and surface area of a sphere is numerically equal, then its radius is
 (a) 2 units (b) 3 units
 (c) 4 units (d) 5 units
- Q8. The length of each side of an equilateral triangle having an area of $9\sqrt{3}$ cm² is
 (a) 8 cm (b) 36 cm
 (c) 4 cm (d) 6 cm
- Q9. AB, CD and PQ are three chords of a circle with centre O, the smallest chord AB is of length 3 cm, the longest chord CD is of length 10 cm and chord PQ is of length 7 cm, then radius of the circle is
 (a) 1.5 cm (b) 3.5 cm
 (c) 5 cm (d) 6 cm
- Q10. AD is a diameter of a circle and AB is a chord. If AD = 34 cm, AB = 30 cm, the distance of AB from the centre of the circle is
 (a) 17 cm (b) 15 cm
 (c) 4 cm (d) 8 cm
- Q11. ABCD is a rhombus such that $\angle ACB = 40^\circ$. Then $\angle ADB$ is
 (a) 40° (b) 45°
 (c) 50° (d) 60°
- Q12. Four points A,B,C,D are joined together in order and we noticed AB = CD = 5 cm and also, AB is parallel to CD then the quadrilateral obtained is a
 (a) rhombus (b) trapezium
 (c) parallelogram (d) rectangle
- Q13. In ΔPQR , $\angle R = \angle P$ and QR = 4cm and PR = 5cm. Then the length of PQ is
 (a) 4 cm (b) 5 cm
 (c) 2 cm (d) 2.5 cm
- Q14. If AB = QR, BC = PR and CA = PQ, then
 (a) $\Delta ABC \cong \Delta PQR$ (b) $\Delta CBA \cong \Delta PRQ$
 (c) $\Delta BAC \cong \Delta RPQ$ (d) $\Delta BCA \cong \Delta PQR$
- Q15. If the difference between two complementary angles is 10° , then the angles are
 (a) $50^\circ, 60^\circ$ (b) $50^\circ, 40^\circ$
 (c) $80^\circ, 10^\circ$ (d) $35^\circ, 45^\circ$
- ★ Q16. Line l is perpendicular to line m and line m is perpendicular to line n , then line l is _____ to line n .
 (a) parallel (b) perpendicular
 (c) intersecting (d) none of these

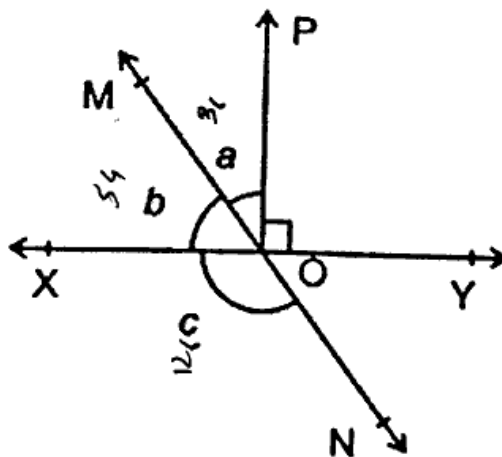
In the given figure, $LM = MN$, $QM = MR$, $ML \perp PQ$ and $MN \perp PR$. Prove that $PQ = PR$.



- Q26. The radius of a circle is 10 cm and a chord of the circle is 12 cm in length. Find the distance of the chord from the centre of the circle.

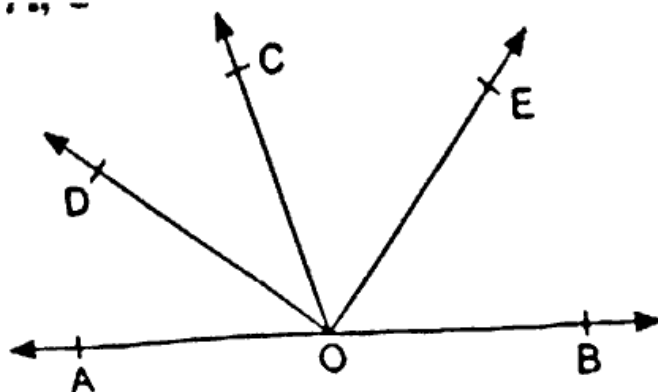
SECTION - C (3x6=18)

- Q26. In a one-day International Cricket match, played between India and England in Kanpur, two Indian batsmen, Yuvraj Singh and M.S. Dhoni scored 200 runs in a partnership including 5 extra runs. Express this information in the form of a linear equation in two variables. Also write the linear equation in the form of $ax + by + c = 0$ and indicate the values of a , b and c .
- Q27. In the given figure, lines XY and MN intersect at O . If $\angle POY = 90^\circ$ and $a : b = 2 : 3$, find c .

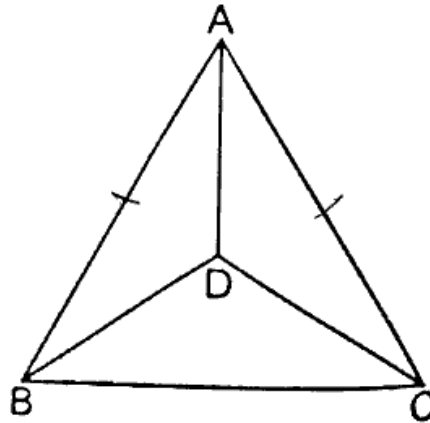


OR

In the given figure, OD is bisector of $\angle AOC$, OE is the bisector of $\angle BOC$ and $OD \perp OE$. Show that the points A , O and B are collinear.



- Q28. In the given figure, $AB = AC$ and D is a point in the interior of $\triangle ABC$ such that $\angle DBC = \angle DCB$. Prove that AD bisects $\angle BAC$ of $\triangle ABC$.



- Q29. If the diagonals of a parallelogram are equal, then show that it is a rectangle.
- Q30. Find the area of a triangle whose perimeter is 180 cm and its two sides are 80 cm and 18 cm. Calculate the altitude of triangle corresponding to its shortest side.
- Q31. The volume of a right circular cone is 9856 cm^3 . If the diameter of the base is 28 cm, find
- height of the cone
 - slant height of the cone
 - curved surface area of the cone

OR

- The radius of hemispherical balloon increases from 6 cm to 12 cm as air is being pumped into it. Find the ratio of surface area of balloon in the two cases.

SECTION - D (5x4=20)

- Q32. The following table gives the distribution of students of two sections according to the marks obtained by them. <https://www.cbseboardonline.com>

Section A		Section B	
Marks	Frequency	Marks	Frequency
0 - 10	3	0 - 10	5
10 - 20	9	10 - 20	19
20 - 30	17	20 - 30	15
30 - 40	12	30 - 40	10
40 - 50	9	40 - 50	1

Represent the marks of the students of both the sections on the same graph by two frequency polygons. From the two polygons compare the performance of the two sections.

- Q33. The triangular side walls of a flyover have been used for advertisements. The sides of the walls are 13 m, 14 m and 15 m. The advertisement yields an earning of ₹ 2000 per m^2 per year. A company hired one of its walls for 6 months. How much rent did it pay?

OR

The perimeter of triangle is 50 cm. One side of a triangle is 4 cm longer than the smaller side and the third side is 6 cm less than twice the smaller side. Find the area of the triangle.

Q34. Find the value of a and b so that $x + 1$ and $x - 1$ are factors of $x^2 + ax^2 + 2x^2 - 3x + b$.

Q35. If $x = 2 + \sqrt{3}$, find the value of $x^3 + \frac{1}{x^3}$

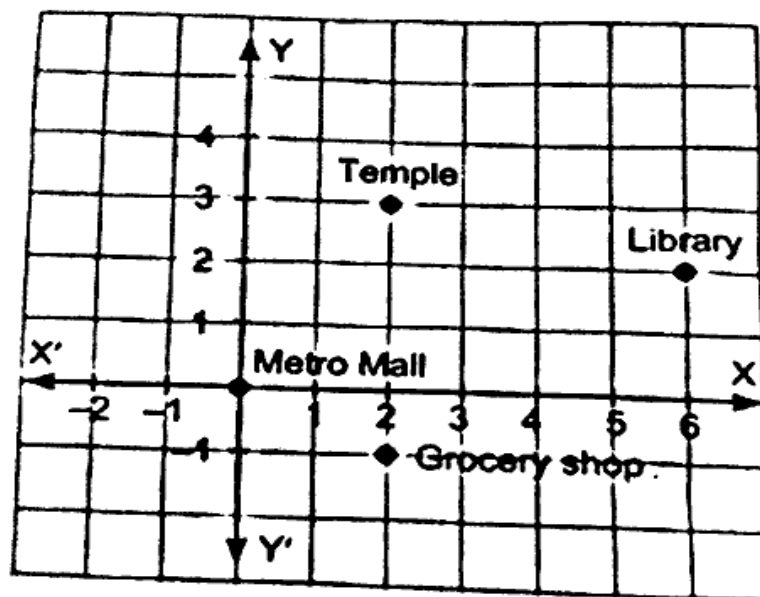
OR

Find the value of a and b if $\frac{7+\sqrt{5}}{7-\sqrt{5}} - \frac{7-\sqrt{5}}{7+\sqrt{5}} = a + \sqrt{5} b$

SECTION - E (4x3=12)

Case study based questions

Q36. Ram, a student of class IX, is residing in a village. One day, he went to metro mall along with his brother. From there, he visited three places library, temple and grocery shop. After returning to his village, he plotted a graph by taking the metro mall as origin and marked three places on the graph as per his direction of movement and distance. The graph is shown below:

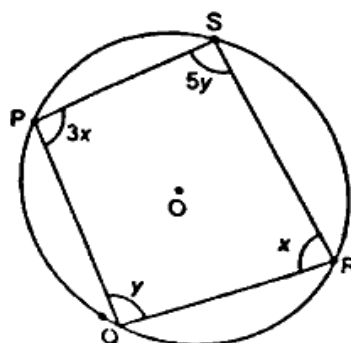


- (a) What are the coordinates of the temple?
- (b) What is the abscissa point of the library?
- (c) Write the sum of ordinates of grocery shop and temple. 2

OR

- (c) What is the distance between temple and grocery shop?

Q37. In a residential colony, there was one circular ground. Members of the colony decided that there should be a skating area available in circular ground so that the children have opportunity to excel themselves in skating. For that purpose they chose four points P, Q, R and S and fenced the area as shown in figure.



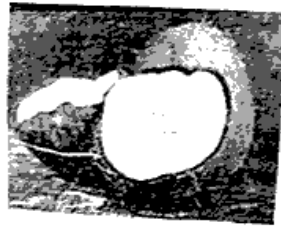
Now answer the following questions:

- (a) What is the measure of $\angle R$?
- (b) What is the value of y ?
- (c) What is measure of $\angle P$?

OR

- (c) What is measure of $\angle S$?

- Q38. Juhi a young girl found a spherical shaped coconut. She consumed the water of the coconut and used her creativity by decorating the outer spherical covering of the coconut and sold it. If the radius of coconut was 2.1 cm (considering the thickness of coconut negligible and coconut-fetty filled with water) then, based on the above situation, answer the following questions:



- (a) What will be the surface area of spherical coconut?
- (b) If Juhi could decorate only half coconut using paper then what would be the area of required paper?
- (c) If the price for decorating coconut is ₹5 per square cm then what would be price of decorating the whole coconut?

OR

- (c) What was the volume of coconut water Juhi consumed?

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