AMRITA VIDYALAYAM
ANNUAL EXAMINATION 2019 - 20

Class : IX

Marks : 80
Time   : 3 hrs

MATHEMATICS

> *GENERAL INSTRUCTIONS:*
> *1. All the questions are compulsory*
> *2. This question paper consists of 40 questions divided into 4 sections A, B, C and D.*
> *3. Section A comprises of 20 questions of 1 mark each. Section B comprises of 6 questions of 2 marks each. Section C comprises of 8 questions of 3 marks each. Section D comprises of 6 questions of 4 marks each.*
> *4. There is no overall choice. However, an internal choice has been provided in two questions of 1 mark each, two questions of 2 marks each, three questions of 3 marks each and three questions of 4 marks each. You have to attempt only one of the alternatives in all such questions.*
> *5. Use of calculators is not permitted.*

SECTION - A

1. If $x = 2$, $y = 1$ is a solution of the equation $2x + 3y = k$, then the value of k is _____.
    a) k = -7   b) k = 0   c) k = 7   d) None of these

2. Degree of the polynomial $x^9 + x^5 + 3x^{10} + 6$ is _____.
    (5, 9, 6, 10)

3. Sum of angles of a quadrilateral is _____.
    (180^0, 360^0, 540^0, None of these)

4. A linear equation in two variables has _____.
    (no solution, infinitely many solution, two solutions, one solution)

5. A square and a rhombus are on the same base and between same parallels. Then ratio of their areas are _____.
    (1:4, 2:1, 1:1, 1:2)

6. In the figure, $\angle APB = 50^0$, then the measure of $\angle AOB$ is _____.
    (25^0, 100^0, 50^0, None of these)

7. What will be the distance of the point (O, -3) from the orgin?
    (0, 3 -3, None of these)

8. In $\triangle ABC$, $\angle B = 32^0$, $\angle C = 73^0$. Then the measure of $\angle A$ is _____.
    (90^0, 73^0, 75^0, None of these)

9. Area of an equilateral triangle of side 8 cm is _____.
    (64 cm², $16\sqrt{3}$ cm², $8\sqrt{3}$ cm², None of these)

10. Mode of the data 11, 12, 14, 12, 10, 9, 11, 12, 17 is _____.
    (11, 12, 10, 17)
11. Decimal representation of an irrational number is _____.
12. Longest chord of a circle is a _____ of the circle.
13. Smallest angle of ΔPQR is P, then the shortest side is _____.

<div align="center">OR</div>

    In right triangle DEF, if $\angle E = 90^0$, then longest side of triangle is _____.
14. Volume of a sphere of radius r is _____.
15. Two angles whose sum is 90^0 are called _____ angles.
16. In a parallelogram ABCD, if $\angle A = 75^0$ find $\angle C$.
17. Find the value of the polynomial $5x^2 - 3x + 7$ at $x = 1$.
18. Find the value of $\dfrac{7\sqrt{45}}{3\sqrt{5}}$.
19. Area of ΔABC is 14 cm². If AD is median to side BC, find area (ΔACD).

<div align="center">OR</div>

    Height of parallelogram ABCD is 12 cm. Length of AB is 10 cm. Find ar (ABCD).
20. State SAS congruence rule.

SECTION - B

21. If Mean of 5, 9, A, 17 and 21 is 13, then find the value of A?
22. Locate $\sqrt{3}$ on the number line.
23. Verify whether 2 and 0 are zeroes of the polynomial $x^2 - 2x$.
24. Write any two solution of equation $4x + 3y = 12$.
25. A chord of length 10 cm is at a distance of 12 cm from the centre of circle. Find radius of the circle.

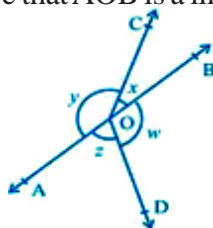<div align="center">OR</div>

    Prove that equal chords of a circle subtend equal angles at centre.
26. In figure, lines PQ and RS intersect each other at point O, if $\angle POR : \angle ROQ = 5 : 7$. Find all the angles.
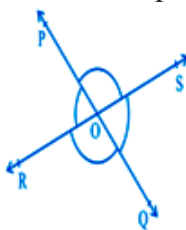
<div align="center">OR</div>

    In figure, if $x + y = w + z$, then prove that AOB is a line.

SECTION - C

27. 1500 families with 2 children were selected randomly and the following data were recorded.

Number of girls in a family	2	1	0
Number of families	475	814	211

<div align="center">2 - IX Math</div>
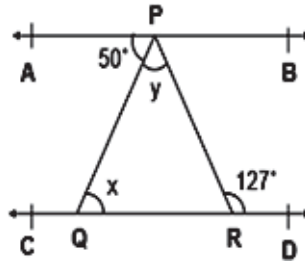
Compute the probability of a family, chosen at random having

  a) 2 girls.   b) 1 girl.   c) no girl.
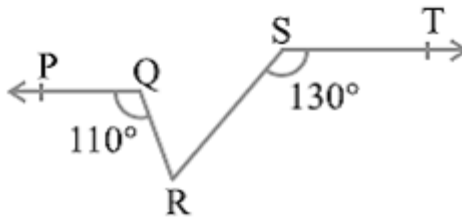
28. Factorise $4x^2 + 9y^2 + 16z^2 + 12xy - 24yz - 16xz$.

29. Prove that parallelograms on the same base and between same parallels are equal in area.

30. If AB || CD, $\angle APQ = 50^0$ and $\angle PRD = 127^0$, find x and y.

OR

In the figure, if PQ || ST, $\angle PQR = 110^0$ and $\angle RST = 130^0$, find $\angle QRS$.

31. Evaluate using suitable identities.

  a) (x - 3) (x + 5)   b) $(102)^3$

OR

  a) State remainder theorem.

  b) Find the remainder when $x^4 + x^3 - 2x^2 + x + 1$ is divided by x - 1.

32. Taxi fare in a city is as follows. For the first km, the fare is ₹ 8 and for subsequent distance it is ₹ 5 per km, taking the distance covered as x km and total fare as ₹ y, write a linear equation for this information and draw its graph.

33. Plot the points A (-1, 1), B (5, 1), C (5, 6), D (-1, 6) in the cartesian plane. Identify the figure ABCD.

34. The sides of a triangle are in the ratio 3 : 4 : 5. If the perimeter of the triangle is 360 m, find its area using Heron's formula. Also find the cost of fencing the triangle with barbed wire at the rate of ₹ 2 per metre.

OR

A triangular park in a city has dimensions 30 m , 26 m and 28 m. A gardener has to plant grass inside it at ₹ 1.50 per m². Find the amount to be paid to the gardener.

SECTION - D

35. A cubical box has each edge 10 cm and another cuboidal box is 12.5 cm long,10c m wide and 8cm high.

  a) Which box has greater lateral surface area and by how much?

  b) Which box has smaller total surface area and by how much?

36. In a city, the weekly observations made in a study on the cost of living index are given in the following table.

Cost of living index	Number of weeks
140-150	5
150-160	10
160-170	20
170-180	9
180-190	6
190-200	2
Total	52

Draw a frequency polygon for the data above.

OR

Draw a Histogram for the following data.

| Daily wages	150-200	200-250	250-300	300-350	350-400
No of workers	48	32	56	40	16

37. Construct a triangle ABC in which $BC = 7cm$, $\angle B = 75^0$ and $AB + AC = 13$ cm.

OR

Construct a triangle ABC in which $BC = 8$ cm, $\angle B = 45^0$ and $AB - AC = 3.5$ cm.

38. Prove that $\dfrac{1}{2 + \sqrt{3}} + \dfrac{2}{\sqrt{5} - \sqrt{3}} + \dfrac{1}{2 - \sqrt{5}} = 0$

39. In $\triangle ABC$ and $\triangle DBC$ are two isosceles triangles on the same base BC and vertices A and D are on same side of BC. If AD is extended to intersect BC at P, show that
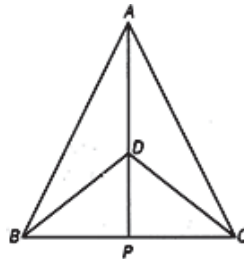
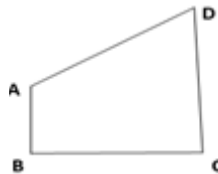a) $\triangle ABD \cong \triangle ACD$ b) $\triangle ABP \cong \triangle ACP$

c) AP bisect $\angle A$ as well as $\angle D$.   d) AP is the perpendicular bisector of BC.

OR

AB and CD are respectively the smallest and longest side of a quadrilateral ABCD. Show that $\angle A > \angle C$ and $\angle B > \angle D$.

40. A rhombus shaped field has green grass for 18 cows to graze, which caused harm to the field. If each side of rhombus is 30 m and its longer diagonal is 48 m, how much area of grass field will each cow be getting? If farmer reduces the numbers of cows to 10 to avoid overgrazing, what value is depicted by him and now what area does each cow get?