Class :IX   **Time :3hrs**
Maximum Marks: 80

1. **This question paper has 5 sections A-E.**
2. **Section A has 20 MCQs carrying 1mark each.**
3. **Section B has 5 questions carrying 2 marks each.**
4. **Section C has 6 questions carrying 3 marks each.**
5. **Section D has 4 questions carrying 5 marks each.**
6. **Section E has 3 case-based questions carrying 4 marks each with subparts of values 1,2 and 1 mark each respectively.**

Section A

1. $(0 + \pi)$ is _____ .
   - a. Rational Number
   - b. Irrational Number
   - c. Whole number
   - d. Natural Number

2. In between any two rational numbers, there are:
   - a. Only one rational number
   - b. Two rational numbers
   - c. Infinite rational numbers
   - d. No rational number

3. $\sqrt{9}$ is _____ number.
   - a. A rational
   - b. An irrational
   - c. Neither rational nor irrational
   - d. None of the above

4. x^2-2x+1 is a polynomial in:
   - a. One Variable
   - b. Two Variables
   - c. Three variable
   - d. None of the above

5. The coefficient of x^2 in $(2x-3)^2$ is:
   - a. 1
   - b. 2
   - c. 3
   - d. 4

6. A binomial of degree 20 in the following is:
   - a. $20x + 1$
   - b. $x/20 + 1$
   - c. $x^{20} +1$
   - d. x^2+20

7. The name of the horizontal line in the cartesian plane which determines the position of a point is called:
   - a. Origin
   - b. X-axis
   - c. Y-axis
   - d. Quadrants

8. If the coordinates of a point are (0, -4), then it lies in/on_____.
   - a. X-axis
   - b. Y-axis
   - c. At origin
   - d. Between x-axis and y-axis

9. A quadrant in which both x and y values are negative is
   - a. First quadrant
   - b. Second quadrant
   - c. Third quadrant
   - d. Fourth quadrant

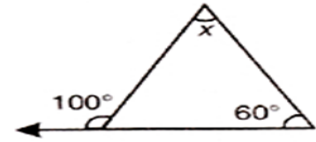10. Two intersecting lines cut each other at:
    a. One point   b. Two points
    c. Three points   d. No point

11. Two angles whose sum is equal to 180° are called:
    a. Vertically opposite angles   b. Complementary angles
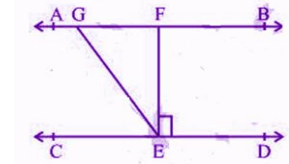   c. Adjacent angles   d. Supplementary angles

12. Value of x in the figure below is:

    a. 20^0 b. 40^0
    c. 80^0 d. 160^0

13. If AB ∥ CD, EF ⊥ CD and ∠GED = 135° as per the figure given below. The value of ∠AGE is:
    a. 120°   b. 140°
    c. 90°   d. 135°

14. For two triangles, if two angles and the included side of one triangle are equal to two angles and the included side of another triangle. Then the congruency rule is:

    a. SSS   b. ASA
    c. SAS   d. None of the above

15. Which of the following is not a criterion for congruence of triangles?
    a) SAS   b) ASA
    c) SSA   d) SSS

16. In Δ ABC, BC = AB and ∠B = 80°. Then ∠A is equal to?

    a) 40°   b) 50°
    c) 80°   d) 100°

17. If the perimeter of an equilateral triangle is 180 cm. Then its area will be:

    a. $900\ cm^2$ b. $900\sqrt{3}cm^2$
    c. $300\sqrt{3}\ cm^2$ d. $600\sqrt{3}\ cm^2$

18. Area of a triangle is equal to:

    a. Base x Height   b. 2(Base x Height)
    c. ½(Base x Height)   d. ½ (Base + Height)

19. Assertion : According to Euclid's geometry, things which are equal to same thing are equal to one another.
    Reason: If AB=PQ, PQ=XY then XY=PQ.
    (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.

20. Assertion: Sum of the pairs of angles 120^0 and 60^0 is 180^0.

   Reason: Two angles, the sum of whose measure is 90^0 are called supplementary angles.

   (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.

Section B

21. Express the rational number $0.\overline{45}$ in the form $\frac{p}{q}$ where p and q are natural number, where $q \neq 0$.

22. Represent$\sqrt{5}$ on the number line.

23. Calculate the perimeter of a rectangle whose dimensions are two binomials with area

   $25x^2 - 35x + 12$.

24. Ravi and Ketan have the same weight. If each of them gain weight by 2 kg, calculate the comparison between their new weights by stating the Euclid's axiom.

Or

   Given that a + b = 10 then a + b + c = 10 + c. Write the Euclid's axiom illustrates this statement?

25. The difference of two complementary angles is 40^0. Find both the angles.

Or

   The exterior angle of a triangle is $110°$ and one of the interior opposite angle is $35°$. Find the other two angles of the triangle.

Section C

26. Find the cost of laying grass in a triangular field of sides 50 m, 65 m and 65 m at the rate of Rs 7 per m^2.

Or

   The perimeter of an isosceles triangle is 32 cm. The ratio of the equal side to its base is 3: 2. Find the area of the triangle

27. State and prove Isosceles Triangle Theorem.

Or

   Bisectors of the angles B and C of an isosceles triangle with AB = AC intersect each other at O. BO is produced to a point M. Prove that $\angle MOC = \angle ABC$.

28. Without plotting the points indicate the quadrant in which they will lie, if

   (i) the ordinate is 5 and abscissa is – 3

   (ii) the abscissa is – 5 and ordinate is – 3

   (iii) the abscissa is – 5 and ordinate is 3

29. Find the values of a and b so that $(2x^3 + ax^2 + x + b)$ has (x + 2) and (2x – 1) as factors.

30. Find the value of $x^3 + y^3 + z^3 - 3xyz$ if $x^2 + y^2 + z^2 = 83$ and x + y + z = 15

31. Simplify $\left(\frac{81}{16}\right)^{\frac{-3}{4}}\left[\left(\frac{25}{9}\right)^{\frac{-3}{2}} \div \left(\frac{5}{2}\right)^{-3}\right]$

Section D

32. Are the square roots of all positive integers irrational? If not, give an example of the square root of a number that is a rational number. Also locate √3 on the number line.

Or

If $\frac{\left(7+\sqrt{5}\right)}{\left(7-\sqrt{5}\right)} + \frac{\left(7-\sqrt{5}\right)}{\left(7+\sqrt{5}\right)} = a + b\sqrt{5}$. Find a & b.
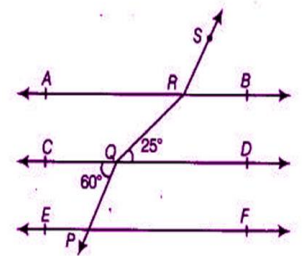
33. Simplify:

$$\frac{(4x^2 - 9y^2)^3 + (9y^2 - 16y^2)^3 + (16z^2 - 4x^2)^3}{(2x - 3y)^3 + (3y - 4z)^3 + (4z - 2x)^3}$$

Or

When a polynomial $p(x) = x^4 - 2x^3 + 3x^2 - ax + b$ is divisible by x – 1 and x + 1, the remainders are 5 and 19 respectively. Find the remainder when p(x) is divided by x – 2.

34. In the figure, if AB ‖ CD ‖ EF, PQ ‖ RS, ∠RQD = 25° and ∠CQP = 60°, then find ∠QRS.

35. Prove that the median drawn on the hypotenuse is half of the hypotenuse.

Section E

36. Rohan and Kavya came across a triangular field in their village. They made the following observations:

- The lengths of the three sides of the triangular field are 8 meters, 12 meters, and 15 meters.
- The perimeter of the triangular field is 35 meters.

Based on this information, the students were asked to apply Heron's Formula to find the area of the triangular field. Let's see if you can answer the questions correctly:

1. Find the semi perimeter of the triangular field.
2. Using Heron's Formula, the area of the triangular field

Or

The length of the altitude corresponding to the side of 15 meters
3. The type of triangle formed by the sides of the field.

37. Maths teacher draws a straight line AB shown on the blackboard as per the following figure.
Now he told Raju to draw another line CD as in the figure.
The teacher told Ajay to mark ∠AOD as 2z.
Suraj was told to mark ∠AOC as 4y.
Clive Made and angle ∠COE = 60°.
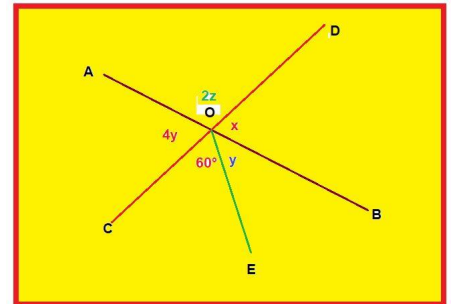Peter marked ∠BOE and ∠BOD as y and x respectively.
Based on the above situation answer the following.

1. What is the value of x
2. What should be the value of x + 2z

Or

What is the value of z
3. What is the value of y?

38. One day, during the audit of a particular school , The auditors visited the classroom. The Maths teacher was teaching the concept of a polynomial to students. The auditor was very much impressed by her way of teaching. To check, whether the students also understand the concept taught by her or not, he asked various questions to students. Some of them are given below. Answer them.

1. Is $y + 3/y$ a polynomial or not? , why?
2. Find the value of k, if $(x - 1)$ is a factor of $4x^3 + 3x^2 - 4x + k$

Or

If $x + 2$ is the factor of $x^3 - 2ax^2 + 16$, then find the value of a.

3. What is he polynomial of the type $ax^2 + bx + c$ called?

Best Wishes for the Exam