

CBSE Board
Class IX Mathematics
Sample Paper 5

Time: 3 hrs**Total Marks: 80****General Instructions:**

1. All questions are **compulsory**.
2. The question paper consists of **30** questions divided into **four sections** A, B, C, and D. **Section A** comprises of **6** questions of 1 mark each, **Section B** comprises of **6** questions of 2 marks each, **Section C** comprises of **10** questions of 3 marks each and **Section D** comprises of **8** questions of 4 marks each.
3. Use of calculator is **not** permitted.

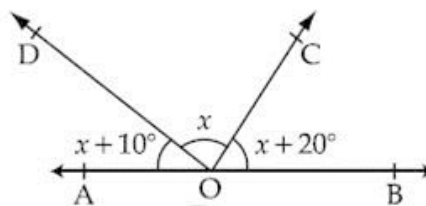
Section A
(Questions 1 to 6 carry 1 mark each)

1. What is the decimal form of $\frac{11}{1000}$?

OR

Is zero a rational number? Justify.

2. $x + y = 2$ and $x - y = 4$. Find the values of x and y .
3. In the given figure, find the value of x ?



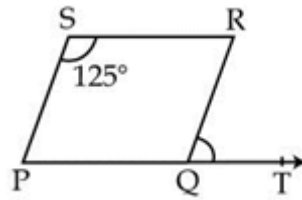
4. If for one of the solutions of the equation $ax + by + c = 0$, x is negative and y is positive, then a portion of the above line will lie in which Quadrant?

OR

The cost of 5 pencils is equal to the cost of 2 ballpoints. Write a linear equation in two variables to represent this statement.

5. The Class marks of a distribution are 47, 52, 57, 62, 67, 72, 77, 82, 87, 92, 97, and 102. Determine the Class size?

6. PQRS is a parallelogram in which $\angle PSR = 125^\circ$. Find $\angle RQT$.



Section B

(Questions 7 to 12 carry 2 marks each)

7. If $a = 2 + \sqrt{3}$, find the value of $a + \frac{1}{a}$.
8. The perpendicular distance of a point from the x-axis is 2 units and the perpendicular distance from the y-axis is 5 units. Write the coordinates of such a point if it lies in one of the following quadrants:
 (i) I Quadrant (ii) II Quadrant (iii) III Quadrant (iv) IV Quadrant
9. The total surface area of a cube is 294 cm^2 . Find its volume.

OR

A matchbox measures $4 \text{ cm} \times 2.5 \text{ cm} \times 1.5 \text{ cm}$. What is the volume of a packet containing 12 such matchboxes?

10. Check which of the following are solutions of the equation $7x - 5y = -3$.
 i. $(-1, -2)$
 ii. $(-4, -5)$

OR

Explain linear equations in two variables.

11. Find the area of an isosceles triangle with base 10 cm and perimeter 36 cm.
12. Simplify: $(-2x + 5y - 3z)^2$.

Section C

(Questions 13 to 22 carry 3 marks each)

13. Express $0.\overline{001}$ as a fraction in the simplest form.

OR

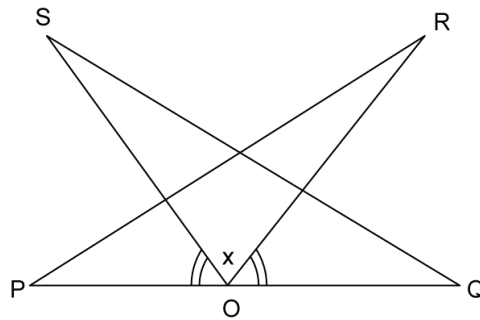
Simplify $\frac{\sqrt{a^2 - b^2} + a}{\sqrt{a^2 + b^2} + b} \div \frac{\sqrt{a^2 + b^2} - b}{a - \sqrt{a^2 - b^2}}$

14. Find the value of $x^3 - 8y^3 - 36xy - 216$ when $x = 2y + 6$.

OR

Find the remainder when $x^3 + 3x^2 + 3x + 1$ is divided by $x + \pi$.

15. In the figure, PQ is a line segment and O is the mid-point of PQ. R and S are on the same side of PQ such that $\angle PQS = \angle QPR$ and $\angle POS = \angle QOR$. Prove that

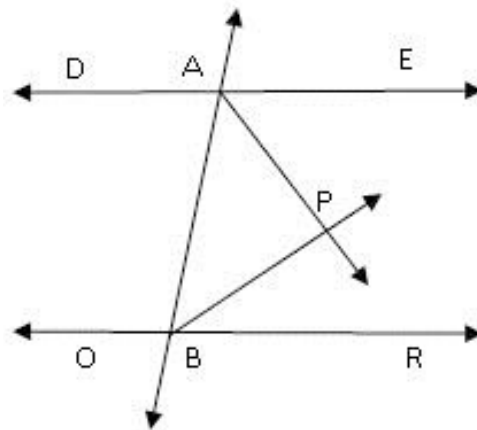


(i) $\Delta PQR \cong \Delta QOS$

(ii) $PR = QS$

16. If the polynomials $az^3 + 4z^2 + 3z - 4$ and $z^3 - 4z + a$ leave the same remainder when divided by $z - 3$, then find the value of a.

17. In the given figure, $DE \parallel OR$ and AP and BP are bisectors of $\angle EAB$ and $\angle RBA$, respectively. Find $\angle APB$.



18. The following frequency distribution table gives the weights of 38 students of a class.

| Weight in kg | Number of students |
|--------------|--------------------|
| 30 – 35 | 10 |
| 35 – 40 | 5 |
| 40 – 45 | 15 |
| 45 – 50 | 5 |
| 50 – 55 | 1 |
| 55 – 60 | 2 |
| Total | 38 |

Find the probability that the weight of students is

- more than or equal to 45 Kg
 - less than 30 kg
 - more than or equal to 30 Kg but less than 60 Kg
19. Find the area of the triangle formed by A (0, 4), O(0, 0) and B(3, 0).
20. If $x = 1 + \sqrt{2}$, find the value of $\left(x - \frac{1}{x}\right)^3$.

OR

Find the value of $x^3 + y^3 - 12xy + 64$ when $x + y = -4$.

21. A wooden article was made by scooping out a hemisphere from each end of a solid cylinder. If the height of the cylinder is 10 cm and its base is 7 cm, find the total surface area of the article.

OR

How much cardboard is required to make 35 penholders in the shape of cylinders, each of radius 3 cm and height 10.5 cm?

22. The length of 40 leaves of a plant are measured correct to one millimeter, and the data obtained is represented in the following table:

| Length (in mm) | Number of leaves |
|----------------|------------------|
| 118 – 126 | 3 |
| 127 – 135 | 5 |
| 136 – 144 | 9 |
| 145 – 153 | 12 |
| 154 – 162 | 5 |
| 163 – 171 | 4 |
| 172 – 180 | 2 |

- Draw a histogram to represent the given data.
- Is there any other suitable graphical representation for the same data?
- Is it correct to conclude that maximum leaves are 153 mm long? Why?

Section D

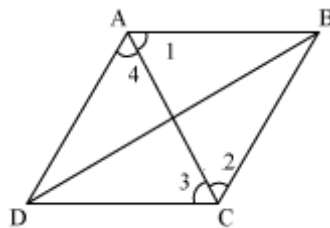
(Questions 23 to 30 carry 4 marks each)

23. Simplify: $\frac{3\sqrt{2} - 2\sqrt{3}}{3\sqrt{2} + 2\sqrt{3}} + \frac{\sqrt{12}}{\sqrt{3} - \sqrt{2}}$

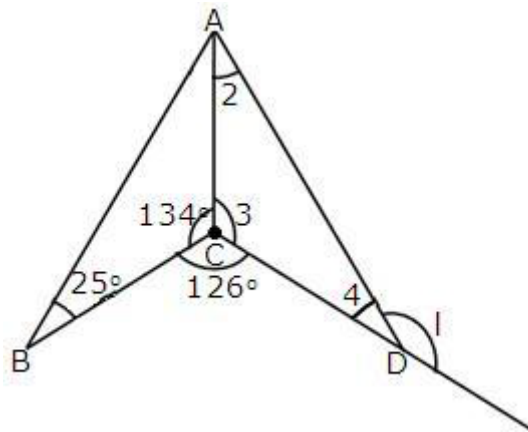
OR

Express $\frac{3}{\sqrt{3} - \sqrt{2} + \sqrt{5}}$ with rational denominator.

24. ABCD is a rhombus. Show that the diagonal AC bisects $\angle A$ as well as $\angle C$ and diagonal BD bisects $\angle B$ as well as $\angle D$.



25. If the polynomial $x^4 + mx^3 - 25x^2 - 16x + n$ is exactly divisible by $x^2 - 4$, then what are the values of m and n ?
26. In the given figure, AC is the bisector of $\triangle BAD$. Find the measures of $\angle 1, \angle 2, \angle 3$ and $\angle 4$.



27. A cube and cuboid have the same volume. The dimensions of the cuboid are in the ratio 1 : 2 : 4. If the difference between the cost of polishing the cube and cuboid at the rate of Rs. 5 per m² is Rs. 80, find their volumes.

OR

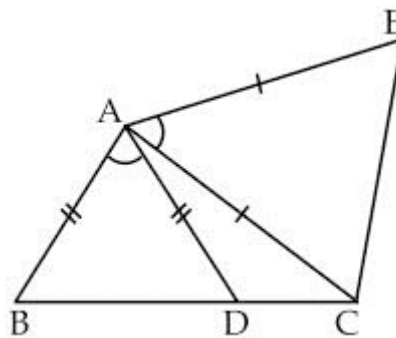
30 circular plates, each of radius 14 cm and thickness 3 cm are placed one above the other to form a cylindrical solid. Find the total surface area and volume of the cylinder formed.

28. If O is point lying inside ΔXYZ , then show that $(OX + OY + OZ)$ cannot be less than the semi-perimeter of ΔXYZ .

OR

Show that the bisectors of the base angles of a triangle can never enclose a right angle.

29. In the given figure, $AC = AE$, $AB = AD$ and $\angle BAD = \angle EAC$. Prove that $BC = DE$.



30. If $m = \frac{1}{2 - \sqrt{3}}$ and $n = \frac{1}{2 + \sqrt{3}}$, then what is the value of $7m^2 + 11mn - 7n^2$?