CBSE Board
Class IX Mathematics
Sample Paper 9

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. Rationalise the denominator of $\frac{1}{3+\sqrt{2}}$.

OR

Multiply $5\sqrt{11}$ and $3\sqrt{11}$.

2. Is point (2, 1) lie on a line whose equation is 2x + y = 5?

3. In Δ ABC, m $\angle$A = x, m $\angle$B = 2x, m $\angle$C = 3x. Find the value of m $\angle$C.

4. Point (–2, –5) will lie in which Quadrant?

OR

Write the ordinate of every point on the x-axis.

5. If the range of the data is 28 and number of classes is 7, then find the class size of the data?

6. O is a center of a Circle and OR $\perp$ PQ, distance of a chord PQ of a circle from the center is 12 cm and the length of the chord is 10 cm, what is the length of a radius?

Section B

(Questions 7 to 12 carry 2 marks each)

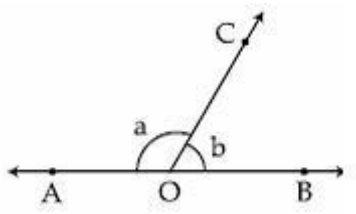
7. Express $0.\overline{975}$ in the form $\frac{p}{q}$, where p and q are integers and q ≠ 0.

8. Factorise: $7\sqrt{2}x^2 - 10x - 4\sqrt{2}$

9. 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

10. In the figure, ∠AOC and ∠BOC form a linear pair. If a – b = 80°, then find the values of a and b.



OR

The angles of a triangle are in the ratio 4 : 5 : 6. Find the greatest angle.

11. The inner diameter of a circular well is 3.5 m. It is 10 m deep. Find
    i. Its inner curved surface area,
    ii. The cost of plastering this curved surface at the rate of Rs 40 per m^2.

OR

Find the volume, total surface area of a cube whose edges measures 20 cm.

12. Find the value of a and b if y = 1 and x = 2 is solution of linear equation ax + by = 3 and 3a – 2b = 1.

Section C

(Questions 13 to 22 carry 3 marks each)

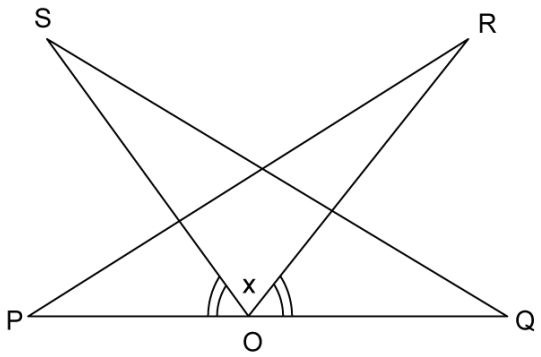
13. Simplify:

$$\frac{(25)^{\frac{3}{2}} \times (343)^{\frac{3}{5}}}{16^{\frac{5}{4}} \times 8^{\frac{4}{3}} \times 7^{\frac{3}{5}}}$$

14. If the polynomials $x^2 - 5x - 3a$ and $ax^2 - 5x - 7$ leave the same remainder when they are divided by $(x - 1)$, then what is the value of a?

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

16. 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

17. Show that the line segments joining the mid points of the opposite sides of a quadrilateral bisect each other.

OR

Show that if the diagonals of a quadrilateral bisect each other at right angles, then it is a rhombus.

18. A company selected 2400 families at random and surveyed them to determine relationship between income level and the number of television sets at home. The information gathered is listed in the table below:

Monthly income in Rs.	Television per family			
	0	1	2	Above 2
Less than 7,000	10	160	25	0
7,000 – 10,000	0	305	27	2
10,000-13,000	1	535	29	1
13,000-16,000	2	469	59	25
16,000 or more	1	579	82	88

If one family is chosen at random find the probability of choosing

i. A family whose income is 16,000 or more and has more than 2 TV sets

ii. A family whose income is less than 7,000 and has 2 TV's

iii. A family whose income is between 10,000 and 13,000 and has 1 TV.

OR

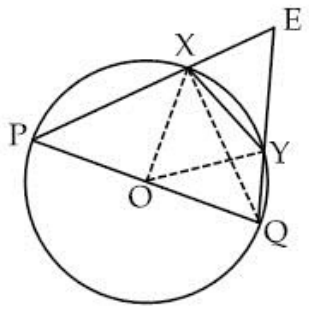
A die is thrown once. Find the probability of getting

i. A prime number

ii. A number lying between 2 and 6

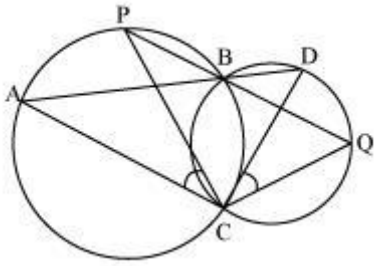
iii. An odd number.

19. In the figure, PQ is the diameter of the circle and XY is chord equal to the radius of the circle. PX and QY when extended intersect at point E. Prove that m ∠PEQ = 60°

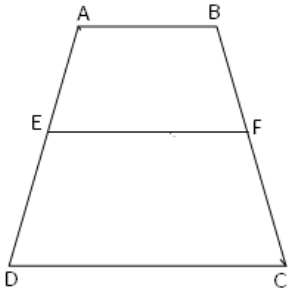


OR

Two circles intersect at two points B and C. Through B, two line segments ABD and PBQ are drawn to intersect the circles at A, D and P, Q respectively.
Prove that ∠ACP = ∠QCD.



20. In the given figure, E is the mid-point of side AD of trapezium ABCD with AB ‖ CD, EF ‖ AB. A line through E parallel to AB meets BC in F. Show that F is the mid-point of BC.



21. Two unbiased dice are tossed 50 times. The sum of integers obtained on the dice is noted below.

Sum	2	3	4	5	6	7	8	9	10	11	12
Frequency	3	9	8	8	4	5	1	3	7	2	0

Find the probability that:

i. The sum of integers is more than 9.

ii. The sum of integers is exactly 7.

iii. The sum of integers is less than 6.

22. 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

A sphere, a cylinder and a cone have the same radius. Find the ratio of their curved surface areas.

(SECTION – D)

(Questions 23 to 30 carry 4 marks each)

23. Simplify: $\frac{16\times 2^{n+1}-4\times 2^{n}}{16\times 2^{n+2}-2\times 2^{n+2}}$

OR

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

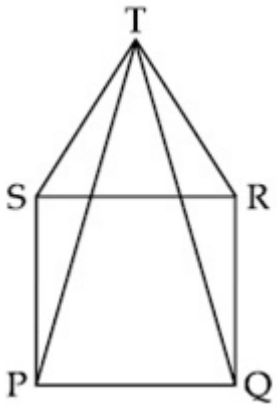
24. Find $x^3 + y^3$ when $x = \frac{1}{3-2\sqrt{2}}$ and $y = \frac{1}{3+2\sqrt{2}}$.

25.

(i) Multiply $9x^2 + 25y^2 + 15xy + 12x - 20y + 16$ by $3x - 5y - 4$ using suitable identities.

(ii) Factorise: $a^2 + b^2 - 2(ab - ac + bc)$.

26. In the figure, PQRS is a square and SRT is an equilateral triangle. Prove that:



a) $\angle PST = \angle QRT$

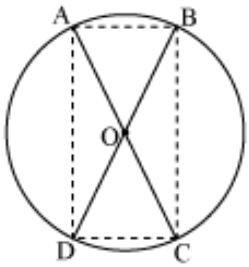
b) PT = QT

27. The cost of painting the complete outside surface of a closed cylindrical oil tank at 60 paise per sq dm is Rs. 237.60. The height of the tank is 6 times the radius of the base of the tank. Find its volume corrected to two decimal places.

OR

A dome of a building is in the form of a hemisphere. From inside, it was white-washed at the cost of Rs. 498.96. If the cost of white-washing is Rs. 2.00 per square metre, find the
Inner surface area of the dome
Volume of air inside the dome.

28. AC and BD are chords of a circle which bisect each other. Prove that (i) AC and BD are diameters; (ii) ABCD is a rectangle.



OR

The lengths of two parallel chords of a circle are 6 cm and 8 cm. If the smaller chord is at distance 4 cm from the centre, what is the distance of the other chord from the centre?

29. Construct ΔABC in which m ∠B = 60°, m ∠C = 45° and the perimeter of the triangle is 11 cm.

30. The bus fare in a city is as follows: For the first kilometre, the fare is Rs. 8 and for the subsequent distance it is Rs. 5 per kilometre. Taking the distance covered as x km and total fares as Rs. y, write a linear equation for this information and draw its graph.