

CBSE Board
Class IX Mathematics
Sample Paper 8

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.

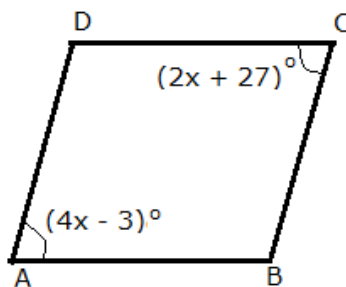
Section A
(Questions 1 to 6 carry 1 mark each)

1. Simplify : $(6 + \sqrt{27}) - (3 + \sqrt{3}) + (1 - 2\sqrt{3})$
2. Find the value of the polynomial $x^2 - x - 1$ at $x = -1$.
3. In $2y - 3 = \sqrt{2}x$, what are the values of a, b and c?

OR

Find the value of k, if $x = 7$, $y = 4$ is a solution of the equation $2x + 3y = k$.

4. In the following figure ABCD is a parallelogram, Find the value of x.



5. 25.7, 16.3, 2.8, 21.7, 24.3, 22.7, 24.9, what is the range of the given data?

OR

Write the class size of the given class intervals: 10-19, 20-29, 30-39.

6. What is the length of a chord which is at a distance 5 cm from the centre of a circle whose radius is 13 cm?

Section B

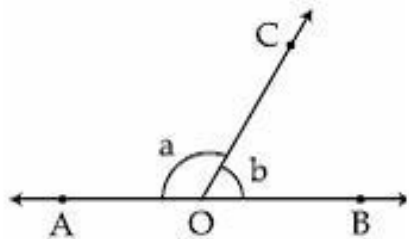
(Questions 7 to 12 carry 2 marks each)

7. Simplify: $\left(\frac{12^{\frac{1}{5}}}{27^{\frac{1}{5}}} \right)^{\frac{5}{2}}$

OR

Simplify : $\sqrt[4]{\sqrt[3]{x^2}}$

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. 10 students of Class X took part in a mathematics quiz. If the number of girls is 4 more than the number of boys, then find the number of boys and the number of girls who took part in the quiz.
10. Find the area of an isosceles triangle with base 10 cm and perimeter 36 cm.
11. What is the area of the triangle having sides of lengths 7 cm, 8 cm and 9 cm?
12. In the figure, $\angle AOC$ and $\angle BOC$ form a linear pair. If $a - b = 80^\circ$, then find the values of a and b .



OR

Find the measure of an angle which is complement of itself.

Section C

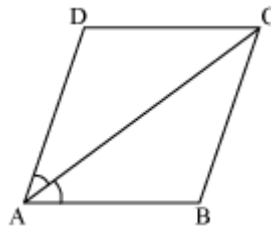
(Questions 13 to 22 carry 3 marks each)

13. If $\frac{3+\sqrt{8}}{3-\sqrt{8}} + \frac{3-\sqrt{8}}{3+\sqrt{8}} = a + b\sqrt{2}$, then find a and b .

OR

Express $\overline{0.001}$ as a fraction in the simplest form.

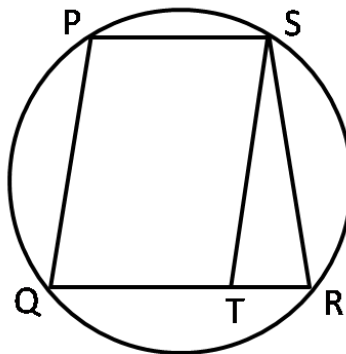
14. The area of a rectangle gets reduced by 80 sq. units if its length is reduced by 5 units and breadth is increased by 2 units. If we increase the length by 10 units and decrease the breadth by 5 units, the area will increase by 50 sq. units. Find the length and breadth of the rectangle.
15. Diagonal AC of a parallelogram ABCD bisects $\angle A$ (see the given figure). Show that
- it bisects $\angle C$
 - ABCD is a rhombus.



OR

The diagonals AC and BD of a rectangle ABCD intersect each other at P. If $\angle ABD = 50^\circ$ then find $\angle DPC$.

16. The ratio of income of two persons is 9 : 7 and the ratio of their expenditures is 4 : 3. If each of them manages to save Rs. 2000 per month, find their monthly income.
17. PQST is a parallelogram. The circle through S, P and Q intersect QT produced at R. Prove that $ST = SR$



18. A game of chance involves spinning an arrow which comes to rest pointing at one of the numbers 1, 2, 3, 4, 5, 6, 7, 8 and these are equally likely outcomes. What is the probability that it will point at
- An odd number?
 - A number greater than 2?
 - A number less than 9?
19. Use a suitable identity to factorise $27p^3 + 8q^3 + 54p^2q + 36pq^2$.

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

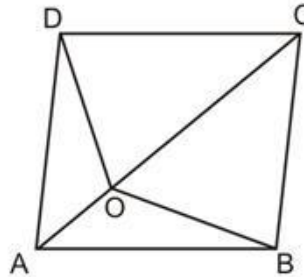
OR

If the points $A(3, 5)$ and $B(1, 4)$ lie on the graph of the line $ax + by = 7$, find the values of a and b .

21. Show that the bisectors of the angles of a parallelogram form a rectangle.

OR

A point O is taken inside an equilateral four-sided figure $ABCD$ such that its distances from the angular points D and B are equal. Show that AO and OC are in the same straight line.



22. A survey was conducted by a group of students as a part of their Environment Awareness Programme, in which they collected the following data regarding the number of plants in 20 houses in a locality. Find the mean number of plants per house.

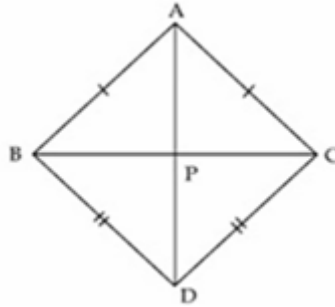
No of plants	0-2	2-4	4-6	6-8	8-10	10-12	12-14
No of houses	1	2	1	5	6	2	3

Section D

(Questions 23 to 30 carry 4 marks each)

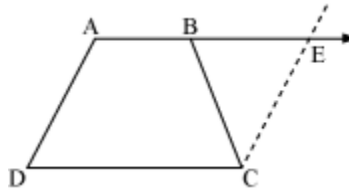
23. Simplify: $\frac{16 \times 2^{n+1} - 4 \times 2^n}{16 \times 2^{n+2} - 2 \times 2^{n+2}}$

24. In the given figure, if the two isosceles triangles have a common base, then prove that the line segment joining their vertices bisects the common base at right angles.

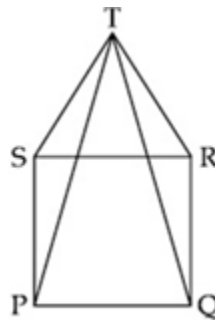


OR

ABCD is a trapezium in which $AB \parallel CD$ and $AD = BC$ (see the given figure). Show that



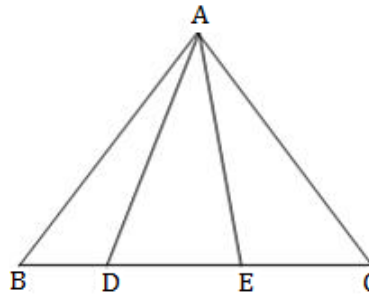
- i. $\angle A = \angle B$
 - ii. $\angle C = \angle D$
 - iii. $\triangle ABC \cong \triangle BAD$
 - iv. Diagonal AC = Diagonal BD
25. Factorize $2x^3 - 3x^2 - 17x + 30$.
26. In the figure, PQRS is a square and SRT is an equilateral triangle. Prove that:



- a) $\angle PST = \angle QRT$
- b) $PT = QT$
- c) $\triangle TSP \cong \triangle TRQ$

OR

In $\triangle ABC$, points D and E are on side BC such that $BD = CE$ and $AD = AE$. Prove that $\triangle ADB$ is congruent to $\triangle AEC$. Is $\angle ABC = \angle ACB$? Why?



27. Sonu and Monu had adjacent triangular fields with a common boundary of 25 m. The other two sides of Sonu's field were 52 m and 63 m, while Monu's were 114 m and 101 m. If the cost of fertilization is Rs 20 per sq m, then find the total cost of fertilization for both Sonu and Monu together.
28. If AD is the median of $\triangle ABC$, then prove that $AB + AC > 2AD$.
29. Ajay was asked to find the sum of the four angles of a quadrilateral. He found the sum of the four angles as 270° by giving the reasoning as follows:
Sum of the three angles of a triangle [made up of three sides]
 $= 2$ right angles $= (3 - 1)$ right angles.
So, the sum of the four angles of quadrilateral [made up of four sides]
 $= (4 - 1)$ right angles $= 3$ right angles $= 270^\circ$.
His classmate Anju pointed out that the sum obtained is incorrect and found the correct sum. Ajay accepted his mistake and thanked Anju for the same. Write the correct solution. What value is depicted from this action?
30. The polynomials $p(x) = ax^3 + 4x^2 + 3x - 4$ and $q(x) = x^3 - 4x + a$ leave the same remainder when divided by $x - 3$. Find the remainder when $p(x)$ is divided by $(x - 2)$.
OR
The polynomials $x^3 + 2x^2 - 5ax - 8$ and $x^3 + ax^2 - 12x - 6$ when divided by $(x - 2)$ and $(x - 3)$ leave remainders p and q, respectively. If $q - p = 10$, then find the value of a.