

CBSE Board
Class IX Mathematics
Sample Paper 4

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. Write the decimal form of $\frac{56}{1000}$.

OR

Simplify $\frac{4}{\sqrt{3}}$ by rationalizing the denominator.

2. What is Linear Equation in two variables?
3. If a triangle and a parallelogram are on the same base and between same parallels, then find the ratio of the area of the triangle to the area of parallelogram?
4. Find the value of p such that $(x - 1)$ is a factor of the polynomial $x^3 + 10x^2 + px$?

OR

Is $g(x) = \sqrt{x} - 3$ polynomial? Justify.

5. 70, 65, 75, 71, 36, 55, 61, 62, 41, 40, 39, 35. Find the range of the data?
6. Three angles of a quadrilateral are 60° , 110° and 86° . What is the measure of the fourth angle of the quadrilateral?

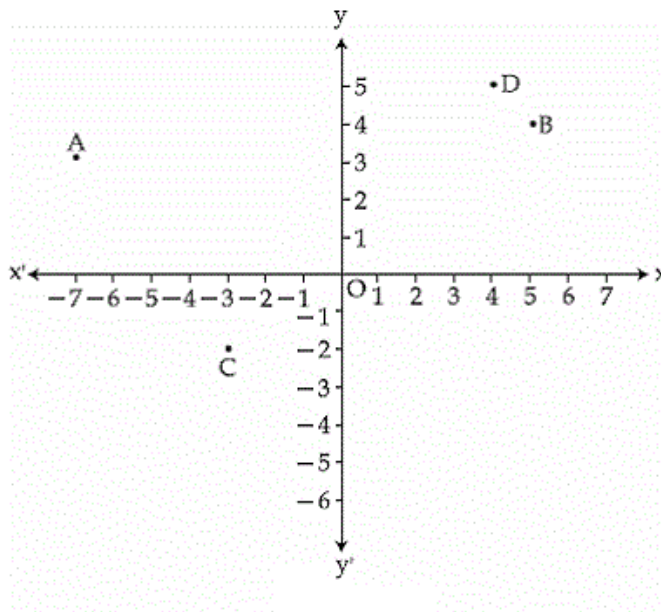
Section B

(Questions 7 to 12 carry 2 marks each)

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

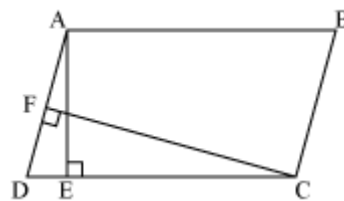
8. How many integral zeroes does the polynomial $3z^3 + 8z^2 - 1$ have?

9. See the given figure and answer the following:



- (i) Coordinates of point A
- (ii) Abscissa of point D
- (iii) The point identified by the coordinates (5, 4)
- (iv) Coordinates of point C

10. In the given figure, ABCD is parallelogram, $AE \perp DC$ and $CF \perp AD$. If $AB = 16$ cm, $AE = 8$ cm and $CF = 10$ cm, find AD.



OR

The lengths of the diagonals of a rhombus are 12 cm and 16 cm. Find the area of the rhombus.

11. How many litres of water flow out through a pipe having 5 cm^2 area of cross section in one minute, if the speed of water in the pipe is 30 cm/sec ?

OR

Find the volume, the total surface area of a cuboid which is 15 m long, 12 m wide and 4.5 m high.

12. Two angles are complementary. The larger angle is 3° less than twice the measure of the smaller angle. Find the measure of each angle.

Section C

(Questions 13 to 22 carry 3 marks each)

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

OR

Simplify by rationalizing the denominator: $\frac{6}{6} \frac{4\sqrt{3}}{4\sqrt{3}}$

14. Which of the following expression are polynomials in one variable? State reasons for your answers:

(i) $\frac{(x+1)(x+2)}{x}$ (ii) $t^2(t^2-3)$

(iii) $\frac{1}{2}(x^2+4x+5)$ (iv) $\sqrt{3}x^2+6\sqrt{x}$

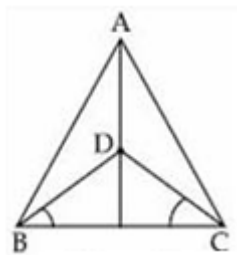
(v) $z+\frac{1}{z}$

15. The polynomials $p(x) = ax^3 + 3x^2 - 3$ and $q(x) = 2x^3 - 5x + a$ when divided by $(x - 4)$ leave the remainders R_1 and R_2 . Find 'a' if $R_1 + R_2 = 0$

OR

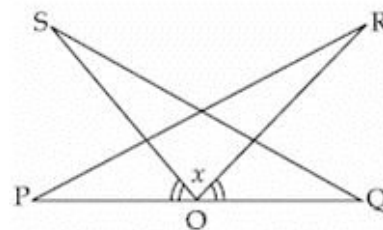
If $p = 2 - a$, prove that $a^3 + 6ap + p^3 - 8 = 0$

16. In figure, $AB = AC$, D is the point in the interior of ΔABC such that $\angle DBC = \angle DCB$. Prove that AD bisects $\angle BAC$ of ΔABC .



17. 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) $\triangle PQR \cong \triangle QOS$
(ii) $PR = QS$



18. The distribution of weight (in kg) of 100 people is given below.

Weight in kg	Frequency
40-45	13
45-50	25
50-55	28
55-60	15
60-65	12
65-70	5
70-75	2

Construct a histogram for the above distribution.

OR

The runs scored by a cricket player in the last 30 innings are:

75, 125, 36, 89, 154, 56, 12, 28, 96, 142, 78, 54, 30, 88, 116, 104, 55, 84, 10, 29, 31, 08, 24, 136, 117, 22, 99, 80, 112, 35.

Arrange these scores in an ascending order and answer the following:

- (i) Find the highest score.
(ii) Find the number of centuries scored by him.
(iii) Find the number of times he scored over 50.
19. Prove that the quadrilateral formed by the bisectors of internal angles of a cyclic quadrilateral is also cyclic.
20. In a parallelogram, show that the angle bisectors of two adjacent angles intersect at right angles.

21. If a dice is rolled once, what is the probability that it will show
i. A multiple of 1? ii. A multiple of 7?

OR

Two coins are tossed simultaneously 400 times, and we get

Two heads: 180 times

One head : 148 times

No head: 72 times

If two coins tossed at random, what is the probability of getting 2 heads, 1 head and zero head?

22. The diameter of a roller is 84 cm and its length is 120 cm. It takes 500 complete revolutions to move over once to level a playground. Find the area of the playground in m^2 ? $\left[\pi = \frac{22}{7}\right]$

Section D

(Questions 23 to 30 carry 4 marks each)

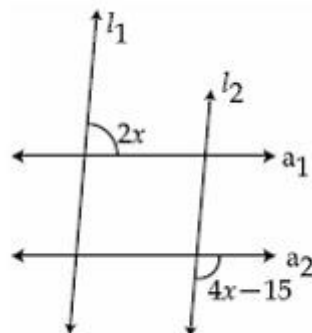
23. If $m = \frac{1}{2-\sqrt{3}}$ and $n = \frac{1}{2+\sqrt{3}}$, then what is the value of $7m^2 + 11mn - 7n^2$?

OR

If both a and b are rational numbers, find a and b in the following expression:

$$\frac{3-\sqrt{5}}{3+2\sqrt{5}} = a\sqrt{5} - b$$

24. In the figure, $l_1 \parallel l_2$ and $a_1 \parallel a_2$. Find the value of x.

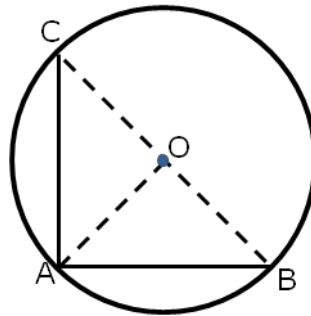


25. Without actual division, prove that $2x^4 + x^3 - 14x^2 - 19x - 6$ is exactly divisible by $x^2 + 3x + 2$.

OR

Factorise $2x^3 - 3x^2 - 17x + 30$.

26. There is a triangular field PQR whose corner angles P, Q and R have been measured as 50° , 60° and 70° , respectively. Three friends Anuja, Nikita and Raghav daily go on morning walk and walk along AB, BC and AC, respectively. Who walk the maximum distance among these three? Who walks the least? What value is indicated from this action?
27. Find:
- The lateral or curved surface area of a closed cylindrical petrol storage tank that is 4.2 m in diameter and 4.5 m high.
 - How much steel was actually used for the constructing the above tank if $\frac{1}{12}$ of the steel actually used was wasted in making the tank?
28. In the given figure, AB and AC are two equal chords of a circle with centre O. Show that O lies on the bisectors of $\angle BAC$.



OR

If two intersecting chords of a circle make equal angles with the diameter passing through their point of intersection, prove that the chords are equal.

29. Construct a triangle XYZ in which angle Y is 30° , angle Z is 90° and $XY + YZ + ZX = 11$ cm.
30. Draw the graph of the line $x - 2y = 4$. From the graph, find the co-ordinates of the point when $x = -1$.