

CBSE Board
Class IX Mathematics
Sample Paper 7

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. If $(\sqrt{5} + \sqrt{6})^2 = a + b\sqrt{30}$, then find the values of a and b.

OR

Examine whether $(\sqrt{3} + 2)^2$ is rational or irrational?

2. What is the value of a polynomial $f(x) = 8x^2 - 3x + 7$ at $x = -1$?

OR

Factorise : $x^3 + 27$

3. In quadrilateral PQRS, $PQ = QR$ and $RS = SP$, then what you can say about the quadrilateral?
4. Comment on the graph of the linear equation $3x = 4$.
5. Find the Number of classes, if the class size is 15 and maximum and minimum values are 159 and 69 respectively.
6. The sides of the given triangle are 6 cm, 8 cm and 10 cm, then what is the value of semi-perimeter of a triangle?

Section B
(Questions 7 to 12 carry 2 marks each)

7. Evaluate: $\sqrt[3]{(343)^{-2}}$

OR

If $\sqrt{7} = 2.646$ then find $\frac{1}{\sqrt{7}}$.

8. Draw the graph of $y - 4x = 8$.

9. Find the value of k, if $x = 1, y = 1$ is a solution of the equation $9kx + 12ky = 63$.

10. A right triangle with its sides 3 cm, 4 cm and 5 cm is rotated about its side of 4 cm to form a cone having base radius as 3 cm. Find the volume of the solid so generated. ($\pi = 3.14$)

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 and surface area of a sphere of radius 21 cm.

12. Factorise: $x^2 + \frac{1}{x^2} + 2 - 2x - \frac{2}{x}$

Section C
(Questions 13 to 22 carry 3 marks each)

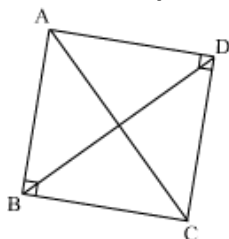
13. Simplify:

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

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

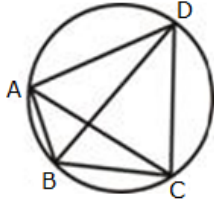
(i) $\frac{(x+1)(x+2)}{x}$ (ii) $t^2(t^2-3)$ (iii) $\frac{1}{2}(x^2+4x+5)$

15. $\triangle ABC$ and $\triangle ADC$ are two right triangles with common hypotenuse AC. Prove that ABCD is a cyclic quadrilateral and hence prove that $\angle CAD = \angle CBD$.



OR

In the given figure, ABCD is a cyclic quadrilateral, in which AC and BD are the diagonals. If $m \angle DBC = 55^\circ$ and $m \angle BAC = 45^\circ$, find $m \angle BCD$.



16. Factorize: $(x - 3y)^3 + (3y - 7z)^3 + (7z - x)^3$.
17. Draw a line segment of length 8 cm and bisect it.
18. A bag contains 12 balls out of which x are white. If one ball is taken out from the bag, find the probability of getting a white ball. If 6 more white balls are added to the bag and the probability now for getting a white ball is double the previous one, find the value of x .

OR

The numbers 50, 42, 35, $(2x + 10)$, $(2x - 8)$, 12, 11, 8 have been written in a descending order. If their median is 25, find the value of x .

19. Draw the graph of $2x + 3y = 11$. From graph, find the value of x , if $y = 5$.
20. 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 $R_1 + R_2 = 0$.
21. A village, having a population of 4000, requires 150 litres of water per head per day. It has a tank measuring $20 \text{ m} \times 15 \text{ m} \times 6 \text{ m}$. For how many days will the water of this tank last?

OR

A hemispherical tank is made up of an iron sheet 1 cm thick. If the inner radius of the tank is 1 m then find the volume of iron used in the tank.

22. Fifty seeds each were selected at random from 5 bags of seeds, and were kept under standardized conditions favorable to germination. After 20 days, the number of seeds which had germinated in each collection were counted and recorded as follows:

Bags	1	2	3	4	5
Number of germinated seeds	40	48	42	39	41

What is the probability of

- i. More than 40 seeds germinating in a bag?
- ii. 49 seeds germinating in a bag?
- iii. More than 35 seeds germinating in a bag?

OR

The mean of 25 observations is 36. Out of these observations, if the mean of first 13 observations is 32 and that of the last 13 observations is 40, find the 13th observation.

Section D

(Questions 23 to 30 carry 4 marks each)

23. Find the value of:

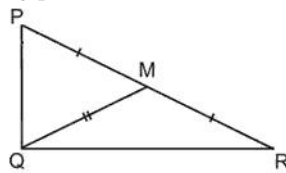
$$\frac{1}{3-\sqrt{8}} - \frac{1}{\sqrt{8}-\sqrt{7}} + \frac{1}{\sqrt{7}-\sqrt{6}} - \frac{1}{\sqrt{6}-\sqrt{5}} + \frac{1}{\sqrt{5}-2}$$

24. Construct ΔXYZ in which $m\angle Y = 30^\circ$, $m\angle Z = 90^\circ$ and $XY + YZ + ZX = 11$ cm.

25. Simplify:
$$\frac{(a^2 - b^2)^3 + (b^2 - c^2)^3 + (c^2 - a^2)^3}{(a - b)^3 + (b - c)^3 + (c - a)^3}$$

26. If M is the mid-point of the hypotenuse PR of a right-angled triangle PQR, prove that

$$QM = \frac{1}{2} PR$$

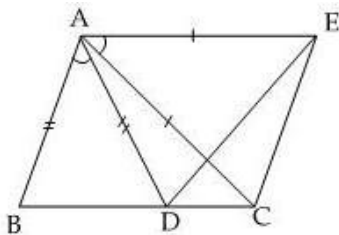


27. A wooden bookshelf has external dimensions as follows: Height = 110 cm, Depth = 25 cm, Breadth = 85 cm. The thickness of the plank is 5 cm everywhere. The external faces are to be polished and the inner faces are to be painted. If the rate of polishing is 20 paise per cm^2 and the rate of painting is 10 paise per cm^2 , find the total expenses required for polishing and painting the surface of the bookshelf.

OR

How many cubic meters of earth must be dug out to sink a well 14 m deep and having a radius of 4 m? If the earth taken out is spread over a plot of dimensions (25 m \times 16 m), what is the height of the platform so formed?

28. In the figure, $AC = AE$, $AB = AD$ and $\angle BAD = \angle EAC$ show that $BC = DE$.



29. How does Euclid's fifth postulate imply the existence of parallel lines? Give a mathematical proof.

OR

Write which of the following statements are true and which are false.

1. Euclid's fourth axiom says that everything equals itself.
 2. The Euclidean geometry is valid only for figures in the plane.
 3. Part of a line with two end points is called a line segment.
 4. A simple closed figure made up of three or more line segments is called a polygon.
30. 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.

OR

Factorise : $x^6 - 7x^3 - 8$