CBSE Board
Class IX Mathematics
Sample Paper 1

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 : $(5 + \sqrt{5})(5 - \sqrt{5})$

2. Find the value of p such that (x – 1) is a factor of the polynomial $x^3 + 10x^2 + px$?

3. In $\triangle$ ABC, $\angle$A = 100° and AB = AC. Find $\angle$ B?

    OR

    Find the angles of an isosceles triangle whose equal angles and the non-equal angles are in the ratio 3:4.

4. The cost of notebook is twice the cost of a pen. Write a linear equation in the two variables to represent this statement?

5. Find the range of data: 70, 65, 75, 71, 36, 55, 61, 62, 41, 40, 39, and 35.

    OR

    What is the class mark of the class interval 45-52?

6. In a parallelogram PQRS, What is the sum of $\angle$R and $\angle$S?

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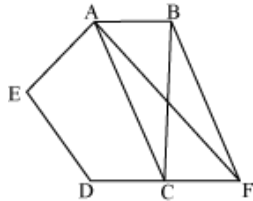### (Questions 7 to 12 carry 2 marks each)

7. Simplify:

    $$\left(\frac{81}{16}\right)^{-3/4} \times \left(\frac{25}{9}\right)^{-3/2}$$

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

9. Where do the following points lie?
   a. (−4, 0)
   b. (−10, 2)
   c. (0, 8)
   d. (10, 4)

10. In the given figure, ABCDE is a pentagon. A line through B and parallel to AC meets DC produced at F. Show that area(ΔACB) = area(ΔACF).

11. A rectangular metallic sheet has dimensions 48 cm × 36 cm. From each corner a square of 8 cm is cut off. An open box is made of the remaining sheet. Find the volume of the box.

    OR

    Find the length of the diagonal in the following cases cuboid of 11 cm by 10 cm by 2 cm.

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

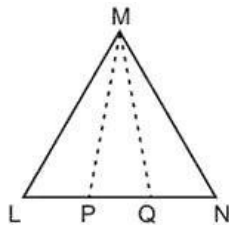## Section C
(Questions 13 to 22 carry 3 marks each)

13. Simplify: $\dfrac{(25)^{\frac{3}{2}} \times (343)^{\frac{3}{5}}}{16^{\frac{5}{4}} \times 8^{\frac{4}{3}} \times 7^{\frac{3}{5}}}$
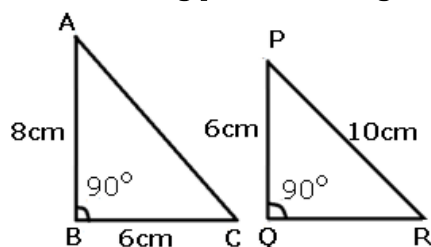
14. (x + 2) is one of the factors of the polynomial $x^3 + 13x^2 + 32x + 20$. Find its remaining factors.

15. In the figure, it is given that LM = MN and LP = QN. Prove that $\triangle LMQ \cong \triangle NMP$
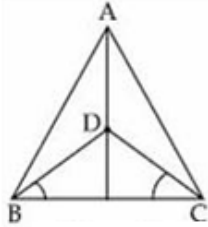

    OR

    The following pairs of triangles are congruent? Give reasons

16. 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 $R_1 + R_2 = 0$. Factorise the polynomial.

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

18. A card is drawn at random from a well-shuffled deck of playing cards. Find the probability that the card drawn is a
    (a)   queen
    (b)   non-ace card
    (c)   black card

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

20. In the given figure, ABCD is a cyclic quadrilateral, in which AC and BD are the diagonals. If m$\angle$DBC = 55° and m$\angle$BAC = 45°, find m$\angle$BCD.
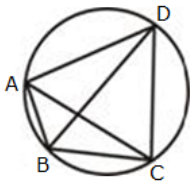
21. The diameter of a roller is 84 cm and its length is 120 cm. It takes 500 complete revolutions to move over once to level a playground. Find the area of the playground in m²? $\left[\pi = \dfrac{22}{7} \right]$

OR

A room is 22 m long, 15 m broad and 6 m high. Find the area of its four walls and the cost of painting it including doors and windows at the rate of Rs 12 per m².

22. The following observations have been arranged in the ascending order.
    29, 32, 48, 50, x, x + 2, 72, 78, 84, 95
    If the median of the data is 63, find the value of x.

OR

The number of goals scored by Arsenal Football Club in the English Premier League in the season 2007 was:
1, 2, 1, 3, 2, 5, 1, 6, 4, 4, 2, 3, 5, 6, 4, 2, 2, 3, 4, 1, 0, 5, 0, 5, 3, 2, 3, 4, 4, 1, 1, 2, 4, 3, 1, 4
Arrange these data in a discrete frequency distribution table and answer the following:
    (i)   What is the range of the number of goals scored by AFC?
    (ii)   How many times did AFC score 3 or more than 3 goals?
    (iii)   Which variate has the highest frequency?

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. How does Euclid's fifth postulate imply the existence of parallel lines? Give a mathematical proof.
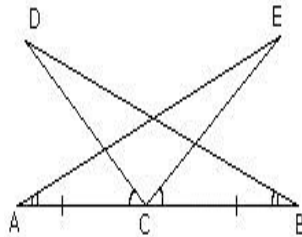
25. Simplify:
$$\frac{\left(a^2-b^2\right)^3 + \left(b^2-c^2\right)^3 + \left(c^2-a^2\right)^3}{\left(a-b\right)^3 + \left(b-c\right)^3 + \left(c-a\right)^3}$$

OR

If $x - \dfrac{1}{x} = 5$; find (i) $x^2 + \dfrac{1}{x^2}$, (ii) $x^4 + \dfrac{1}{x^4}$

26. In the figure, if AC = BC, ∠DCA = ∠ECB and ∠DBC = ∠EAC, then prove that BD = AE.

27. The volume of a cylinder is 6358 cu. cm and its height is 28 cm. Find its radius and the curved surface area.

OR

Find the cost of sinking a tube well 350 m deep, having a diameter of 4 m at the rate of Rs 16 per m³. Find also the cost of cementing its inner curved surface at Rs 12 per m²

28. Construct a triangle having a perimeter of 12.5 cm and angles in the ratio of 3 : 4 : 5.

29. 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.

30. Neha and Richa, two students of class IX of a school, together contributed Rs. 100 towards the Prime Minister's Relief Fund, to help earthquake victims. Assume Neha's contribution to be x and that of Richa to be y. Write a linear equation which this data satisfies and draw a graph of the same.