Maharashtra State Board
Class IX Mathematics
(Algebra) Board Paper 1

Time: 2 hours   **Total Marks: 40**

Note: - (1) All questions are compulsory.
        (2) Use of calculator is not allowed.

1.   Attempt any five sub-questions from the following: **5**

   i. State whether C = $\{p | p \in I, p^3 = -8\}$ is a singleton set or not.

   ii. Simplify and express the result in its simplest form:

      $27 \sqrt[3]{18} \div 3 \sqrt[3]{9}$

   iii. If $p(x) = 2x^3 - 3x^2 + 4x - 5$, find the remainder when p(x) is divided by
      x − 1.

   iv. Find the mode of 18, 14, 22, 23, 14, 18, 17, 18, 28, 28, 14, 25, 14.

   v. If A = {2, 3, 4} and B = {3, 5}, find A ∩ B and A ∪ B.

   vi. Find the median of 5, 3, 11, 0, 7, 11, 4, 3, 8.

2.   Attempt any four sub-questions from the following: **8**

   i. Find the square root of the following: $8 + 2\sqrt{15}$

   ii. Draw the graph of x = 3.

   iii. In which quadrant do the following points lie?

     (a) (−3, 2)

     (b) (−x, −y)

   iv. The given data is arranged in ascending order. The sum of mode and median of the given data is 15. Find the value of y.

     y − 1, y − 1, y + 1, y + 4, 2y + 1, 3y, 4y

   v. Find the order relation between the following ratio; a, b, c are integers.

     $\dfrac{a-1}{b-1}, \dfrac{a+1}{b+1}$, where a > b and b ≠ ±1

   vi. All 30 members of a 'Nature Club' in a school planted trees on the foundation day. The number of saplings planted by each member is given below.

     5, 4, 4, 6, 7, 4, 3, 5, 6, 4, 3, 7, 5, 4, 3,
     2, 7, 6, 5, 3, 8, 3, 2, 4, 5, 6, 5, 4, 4, 5.

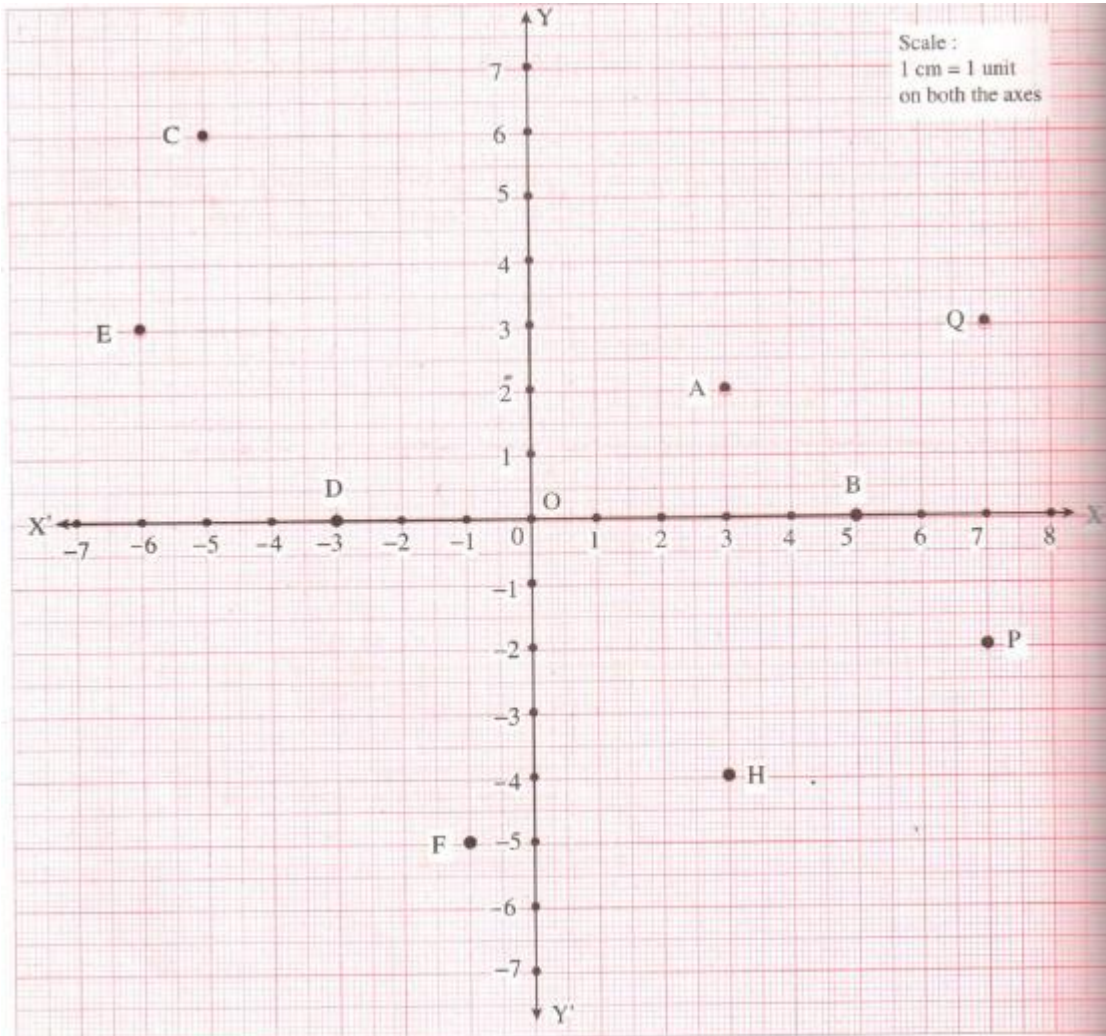   Prepare an ungrouped frequency distribution table.

3. Attempt any three of the following sub-questions: 9

   i. Factorise: $6a^4 + 11a^2b^2 - 10b^4$

   ii. Simplify: $\sqrt{294} - 3\sqrt{\dfrac{1}{6}} - 5\sqrt{6} + \sqrt{252}$

   iii. Read the graph and write the answers of the following questions.

     (a) Which co-ordinate of point B is zero?

     (b) Which points have co-ordinates (-1, -5) and (3, 2)?

     (c) To which axis the line AH is parallel?

     (d) Which co-ordinates of point P and Q is the same?

     (e) Which co-ordinates of E is 3?

     (f) M is any point on the line AH, then state its x-co-ordinate.

   iv. If $\dfrac{(p+1)^{\frac{1}{3}} + (p-1)^{\frac{1}{3}}}{(p+1)^{\frac{1}{3}} - (p-1)^{\frac{1}{3}}}$, show that $y^3 - 3py^2 + 3y - p = 0$.

v. The figures of income and expenditure (in Rs.) of a company are given. The figures are in lakhs. Draw a subdivided bar diagram to represent the following information.

Year	2004-05	2005-06	2006-07	2007-08
Income	155	162	181	190
Expenditure	148	152	169	172

4. Attempt any two sub-questions from the following: 8

i. Five numbers are in continued proportion whose second term is 6 and fourth term is 54. Find the numbers.

ii. Rationalize the denominator: $\dfrac{1}{\sqrt{6} + \sqrt{5} - \sqrt{11}}$

iii. Find the quadratic polynomial, the sum and product of whose zeroes are respectively $\dfrac{4 + \sqrt{2}}{2}$ and $\dfrac{4 - \sqrt{2}}{2}$.

5. Attempt any two of the following sub-questions: 10

i. Solve the following problem by using two variables.

Two numbers are in the ratio 5 : 6. If 8 is subtracted from each of the number, the ratio becomes 4 : 5. Find the numbers.

ii.

(a) Verify that 2 and 9 are the zeroes of the polynomial

p(x) = (x − 2)(x − 9).

(b) When $x^3 + ax^2 + 4x − 5$ is divided by (x + 1), the remainder is 14. Find a.

iii. In a school, all the students play either Basket ball or Volley ball or both. 400 students play Basket ball, 170 students play Volley ball and 100 students play both games. Find

(a) the number of students who play Basket ball only

(b) the number of students who play Volley ball only

(c) the total number of students in the school.