PRACTICE PAPER

ICSE CLASS 10 – MATHEMATICS

Chapter 13 : Section and Mid-Point Formula

(Coordinate Geometry : Section Formula, Mid-Point Formula, Centroid of a Triangle)

Maximum Marks: 40 Time allowed: One and a half hours

1. *Answers to this Paper must be written on the paper provided separately.*
2. *You will not be allowed to write during the first 10 minutes. This time is to be spent in reading the question paper.*
3. ***The time given at the head of this Paper is the time allowed for writing the answers.***
4. *Attempt **all** questions from **Section A** and **any two** questions from **Section B**.*
5. ***All working, including rough work, must be clearly shown, and must be done on the same sheet as the rest of the answer.***
6. ***Omission of essential working will result in loss of marks.***
7. *The intended marks for questions or parts of questions are given in brackets [ ].*
8. *Notation: P divides AB in the ratio $m_1 : m_2$ means $AP : PB = m_1 : m_2$. G denotes the centroid of a triangle.*

Question 1

Choose the correct answers to the questions from the given options. [8]

(Do not copy the question, write the correct answers only.)

(i) The mid-point of the line segment joining (−6, 4) and (2, −10) is:

(a) (−2, −3)
(b) (−4, −6)
(c) (−2, 3)
(d) (4, 7)

(ii) The point which divides the join of A(1, −2) and B(7, 10) in the ratio 1 : 2 is:

(a) (5, 6)
(b) (3, 2)
(c) (4, 3)
(d) (3, 4)

(iii) The centroid of the triangle with vertices (4, −1), (−2, 5) and (1, 2) is:

(a) (3, 6)
(b) (2, 1)
(c) (1, 2)
(d) (1, 6)

(iv) The end points of a diameter of a circle are (−3, 5) and (7, −1). The centre of the circle is:

(a) (5, 2)
(b) (4, 4)
(c) (2, 3)
(d) (2, 2)

(v) The y-axis divides the join of (−2, 3) and (6, 9) in the ratio:

(a) 3 : 1
(b) 2 : 3
(c) 1 : 3
(d) 1 : 2

(vi) The point P(−1, 4) is the mid-point of A(3, m) and B(n, 2). The value of m + n is:

(a) 11
(b) 1
(c) −1
(d) −11

(vii) **Assertion (A):** The point (2, 3) is the mid-point of the line segment joining (−1, 1) and (5, 5).

Reason (R): The mid-point of the join of (x_1, y_1) and (x_2, y_2) is $((x_1 + x_2)/2, (y_1 + y_2)/2)$.

(a) (A) is true and (R) is false.
(b) (A) is false and (R) is true.
(c) Both (A) and (R) are true, and (R) is the correct explanation for (A).
(d) Both (A) and (R) are true, but (R) is not the correct explanation for (A).

(viii) **Assertion (A):** The centroid of a triangle divides each median in the ratio 1 : 2, measured from the vertex.

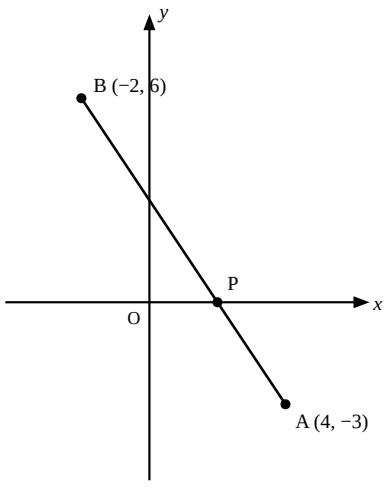
Reason (R): The centroid of a triangle is the point of intersection of its medians.

(a) (A) is true and (R) is false.
(b) (A) is false and (R) is true.
(c) Both (A) and (R) are true, and (R) is the correct explanation for (A).
(d) Both (A) and (R) are true, but (R) is not the correct explanation for (A).

Question 2

(i) Find the co-ordinates of the point P which divides the join of A(−3, 7) and B(6, −5) in the ratio 1 : 2. State on which axis P lies. [4]

(ii) The figure shows the line segment joining A(4, −3) and B(−2, 6), which cuts the x-axis at P. Find the ratio AP : PB and the co-ordinates of P. [4]



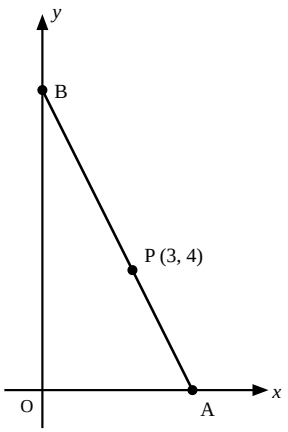
(iii) The mid-point of the line segment joining A(2a + 1, 4) and B(−3, 3b − 1) is (5, b + 1). Find the values of a and b. [4]

SECTION B (20 Marks)

*(Attempt **any two** questions from this Section.)*

Question 3

(i) In the figure, the line segment AB meets the x-axis at A and the y-axis at B. The point P(3, 4) lies on AB and AP : PB = 2 : 3. Find the co-ordinates of A and B. [3]



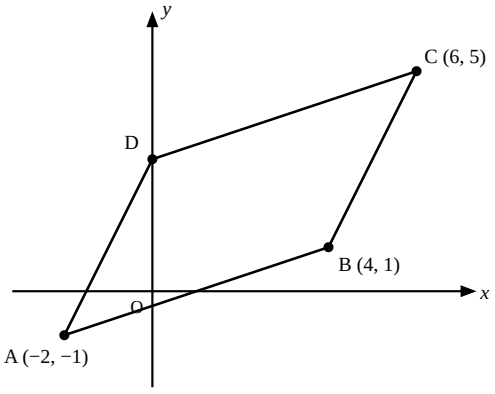
(ii) Find the co-ordinates of the points of trisection of the line segment joining A(−4, 7) and B(8, −5). [3]

(iii) Show that P(5, m) is a point of trisection of the line segment joining A(−3, 2) and B(9, −4). Hence find the value of m. [4]

Question 4

(i) M(1, −2) is the mid-point of the line segment AB. If A = (−3, 4), find the co-ordinates of B. [3]

(ii) The figure shows a parallelogram ABCD in which A(−2, −1), B(4, 1) and C(6, 5). Find the co-ordinates of the fourth vertex D. [3]



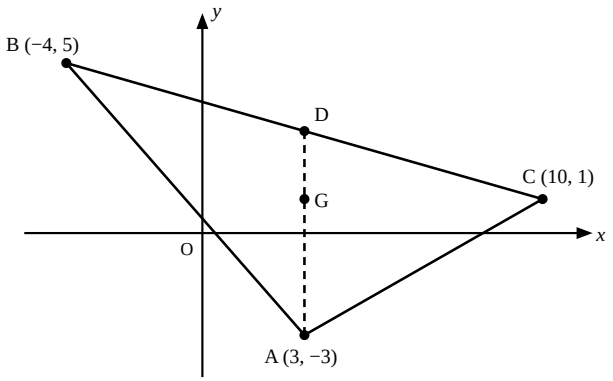
(iii) The points D(3, −1), E(5, 3) and F(1, 2) are the mid-points of the sides BC, CA and AB respectively of a triangle ABC. Find the co-ordinates of A, B and C. [4]

Question 5

(i) Find the centroid of the triangle whose vertices are A(−4, 3), B(2, −5) and C(8, 5). [3]

(ii) The centroid of the triangle with vertices A(1, 4), B(a + 2, 3) and C(5, b − 1) is G(3, 1). Find the values of a and b. [3]

(iii) In the figure, A(3, −3), B(−4, 5) and C(10, 1) are the vertices of a triangle ABC. D is the mid-point of BC and G is the centroid of the triangle. (a) Find the co-ordinates of D. (b) Find the length of AD. (c) Find the co-ordinates of the centroid G of the triangle. (d) Verify that G divides AD in the ratio 2 : 1. [4]

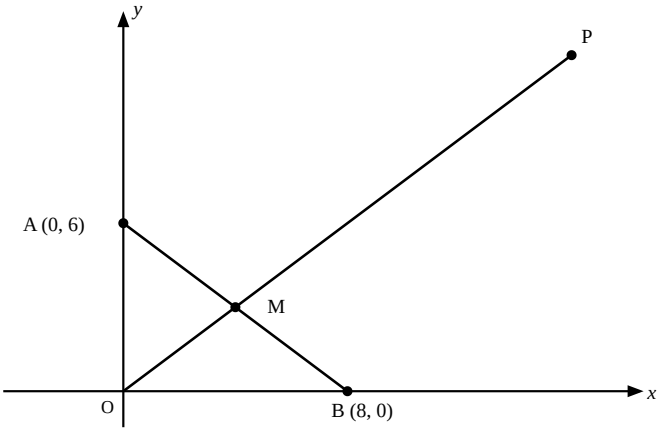


Question 6

(i) The point P(a, 5) lies on the line segment joining A(−2, 3) and B(7, 9). Find the ratio in which P divides AB and hence find the value of a. [3]

(ii) The points P(4, 2), Q(a, 5) and R(10, b) are collinear, and Q is the mid-point of PR. Find the values of a and b. [3]

(iii) In the figure, A(0, 6) and B(8, 0) lie on the axes and O is the origin. M is the mid-point of AB, and M also divides OP in the ratio OM : MP = 1 : 3. Find: (a) the co-ordinates of M; (b) the co-ordinates of P; (c) the area of triangle OAP. [4]



— End of Question Paper —