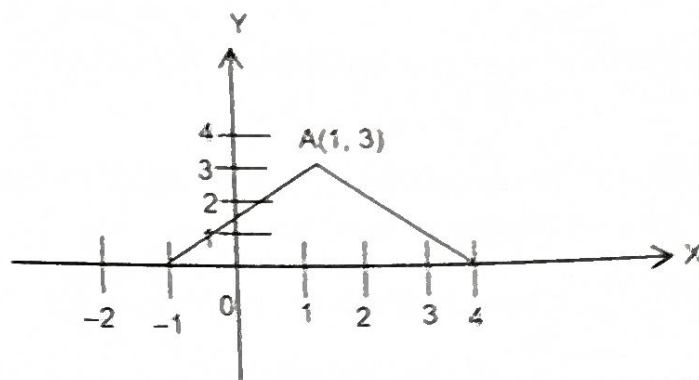


LINES (IN TWO DIMENSION)-COORDINATE GEOMETRY

1. Show that the points A (1, 2), B (5, 4), C (3, 8) and D (-1, 6) are the vertices of a square. (CBSE 2005-06, 4 marks)
2. Find the coordinates of the point equidistant from three given points A (5, 1), B (-3, 7) and C (7, -1) (CBSE 2005-06, 4 marks)
3. Find the value of p for which the point (-1, 3), (2, p) and (5, -1) are collinear. (CBSE 2005-06, 4 marks)
4. The coordinates of the mid - points of the sides of a triangle are (4, 3), (6, 0) and (7, -2). Find the coordinates of the centroid of the triangle. (CBSE 2006-07, 3 marks)
5. If the distance of P (x, y) from two points with coordinates (5, 1) and (-1, 5) is equal prove that $3x = 2y$. (CBSE 2006-07, 3 marks)
6. Find the value of k if the points (k, 3), (6, -2) and (-3, 4) are collinear. (CBSE 2006-07, 3 marks)
7. If P divides the joint of A (-2, -2) and B (2, -4) such that $\frac{AP}{AB} = \frac{3}{7}$, find the coordinates of P. (CBSE 2007-08, 3 marks)
8. The midpoints of the sides of a triangle are (3, 4) (4, 6) and (5, 7). Find the coordinates of the vertices of the triangle. (CBSE 2007-08, 3 marks)
9. Find the value of a so that the point (3, a) lies on the line represented by $2x - 3y = 5$. (CBSE 2008-09, 1 mark)
10. Find the distance between the points $\left(\frac{-8}{5}, 2\right)$ and $\left(\frac{2}{5}, 2\right)$. (CBSE 2008-09, 1 mark)
11. Find the point on y - axis which is equidistant from the point (5, -2) and (-3, 2) (CBSE 2008-09, 3 marks)
12. The line segment joining the points A (2, 1) and B (5, -8) is trisected at the points P and Q such that P is nearer to A. If P also lies on the line given by $2x + y + k = 0$, find the value of k. (CBSE 2008-09, 3 marks)
13. If P (x, y) is any point on the line joining the points A (a, 0) and B (0, b) then show that $\frac{x}{a} + \frac{y}{b} = 1$ (CBSE 2008-09, 3 marks)
14. Are the points (0, 5), (0, -9) and (3, 6) collinear? Justify your answer. (CBSE 2011-12, 2 marks)
15. If the points A(4, 3) and B(x, 5) are on the circle with the centre O (2, 3), find the value of x. (CBSE 2011-12, 2 marks)
16. Using distance formula, show that the points (3, 2), (0, 5), (-3, 2) and (0, -1) are the vertices of a square. (CBSE 2011-12, 3 marks)

17. Find the ratio in which the line segment joining the points $A(3, -6)$ and $B(5, 3)$ is divided by x -axis. Also find the coordinates of the point of intersection.
(CBSE 2011-12, 3 marks)

18. In figure, the area of triangle ABC (in sq. units) is:
(A) 15
(B) 7.5
(C) 10
(D) 2.5



(CBSE 2012-13, 1 mark)

19. Prove that the points $(7, 10)$, $(-2, 5)$ and $(3, -4)$ are the vertices of an isosceles right triangle.
(CBSE 2012-13, 3 marks)

20. Find the ratio in which the y -axis divides the line segment joining the points $(-4, -6)$ and $(10, 12)$. Also find the coordinates of the point of division.
(CBSE 2012-13, 3 marks)

21. The three vertices of a parallelogram ABCD are $A(3, -4)$, $B(-1, -3)$ and $C(-6, 2)$. Find the coordinates of vertex D and find the area of ABCD.
(CBSE 2012-13, 4 marks)

22. If $A(5, 2)$, $B(2, -2)$ and $C(-2, t)$ are the vertices of a right angled triangle with $\angle B = 90^\circ$, then find the value of t .
(CBSE 2014-15, 2 marks)

23. Find the ratio in which the point $P\left(\frac{3}{4}, \frac{5}{12}\right)$ divides the line segment joining the points $A\left(\frac{1}{2}, \frac{3}{2}\right)$ and $B(2, -5)$.
(CBSE 2014-15, 2 marks)

24. Find the area of the triangle ABC with $A(1, -4)$ and mid-points of sides through A being $(2, -1)$ and $(0, -1)$.
(CBSE 2014-15, 3 marks)

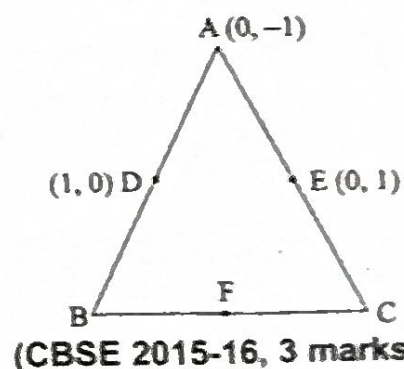
25. Find the area of the triangle PQR with $Q(3, 2)$ and the mid-points of the sides through Q being $(2, -1)$ and $(1, 2)$.
(CBSE 2014-15, 3 marks)

26. If $A(-4, 8)$, $B(-3, -4)$, $C(0, -5)$ and $D(5, 6)$ are the vertices of a quadrilateral ABCD, find its area.
(CBSE 2014-15, 4 marks)

27. Find the ratio in which y -axis divides the line segment joining the points $A(5, -6)$ and $B(-1, -4)$. Also find the coordinates of the point of division.
(CBSE 2015-16, 2 marks)

28. The x -coordinate of a point P is twice its y -coordinate. If P is equidistant from $Q(2, -5)$ and $R(-3, 6)$, find the coordinates of P.
(CBSE 2015-16, 2 marks)

29. In figure, ABC is a triangle coordinates of whose vertex A are $(0, -1)$. D and E respectively are the mid points of the sides AB and AC and their coordinates are $(1, 0)$ and $(0, 1)$ respectively. If F is the mid-point of BC, find the areas of $\triangle ABC$ and $\triangle DEF$.

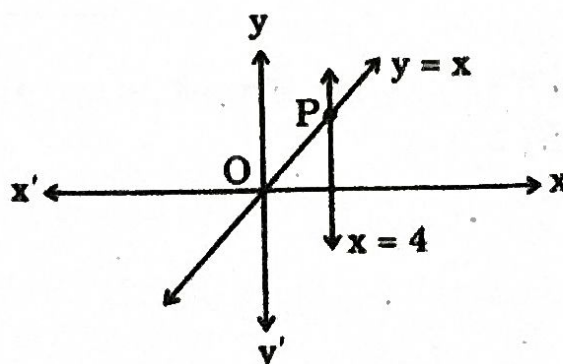


(CBSE 2015-16, 3 marks)

30. Prove that the area of a triangle with vertices $(t, t-2)$, $(t+2, t+2)$ and $(t+3, t)$ is independent of t .
 (CBSE 2015-16, 4 marks)
31. If the distance between the points $(4, k)$ and $(1, 0)$ is 5, then what can be the possible values of k ?
 (CBSE 2016-17, 1 mark)
32. Show that $\triangle ABC$, where $A(-2, 0)$, $B(2, 0)$, $C(0, 2)$ and $\triangle PQR$ where $P(-4, 0)$, $Q(4, 0)$, $R(0, 4)$ are similar triangles.
 (CBSE 2016-17, 3 marks)
33. The area of a triangle is 5 sq. units. Two of its vertices are $(2, 1)$ and $(3, -2)$. If the third vertex is $\left(\frac{7}{2}, y\right)$, find the value of y .
 (CBSE 2016-17, 3 marks)
34. If $a \neq b \neq 0$, prove that the points (a, a^2) , (b, b^2) , $(0, 0)$ will not be collinear.
 (CBSE 2016-17, 4 marks)
35. Find the distance of a point $P(x, y)$ from the origin.
 (CBSE 2017-18, 1 mark)
36. Find the ratio in which $P(4, m)$ divides the line segment joining the points $A(2, 3)$ and $B(6, -3)$. Hence find m .
 (CBSE 2017-18, 2 marks)
37. If $A(-2, 1)$, $B(a, 0)$, $C(4, b)$ and $D(1, 2)$ are the vertices of a parallelogram $ABCD$, find the values of a and b . Hence find the lengths of its sides.
 (CBSE 2017-18, 3 marks)
38. If $A(-5, 7)$, $B(-4, -5)$, $C(-1, -6)$ and $D(4, 5)$ are the vertices of a quadrilateral, find the area of the quadrilateral $ABCD$.
 (CBSE 2017-18, 3 marks)
39. Find the coordinates of a point A , where AB is a chord of a circle whose centre is $(2, -3)$ and B is the point $(1, 4)$.
 (CBSE 2018-19, 1 mark)
40. Find the ratio in which the segment joining the point $(1, -3)$ and $(4, 5)$ is divided by x -axis? Also find the coordinates of this point on x -axis.
 (CBSE 2018-19, 2 marks)
41. Find the point on y -axis which is equidistant from the point $(5, -2)$ and $(-3, 2)$.
 (CBSE 2018-19, 3 marks)
- OR**
- The line segment joining the points $A(2, 1)$ and $B(5, -8)$ is trisected at the points P and Q such that P is nearer to A . If P also lies on the line given by $2x - y + k = 0$. Find the value of k .
 (CBSE 2018-19, 3 marks)
42. The distance between the points $(a \cos \theta + b \sin \theta, 0)$ and $(0, a \sin \theta - b \cos \theta)$, is
 (CBSE 2019-20, 1 mark)
- (A) $a^2 + b^2$ (B) $a^2 - b^2$ (C) $\sqrt{a^2 + b^2}$ (D) $\sqrt{a^2 - b^2}$
43. If the point $P(k, 0)$ divides the line segment joining the points $A(2, -2)$ and $B(-7, 4)$ in the ratio 1 : 2, then the value of k is,
 (CBSE 2019-20, 1 mark)
- (A) 1 (B) 2
 (C) -2 (D) -1
44. The value of p , for which the points $A(3, 1)$, $B(5, p)$ and $C(7, -5)$ are collinear, is
 (CBSE 2019-20, 1 mark)
- (A) -2 (B) 2
 (C) -1 (D) 1

45. Find the area of triangle PQR formed by the points $P(-5, 7)$, $Q(-4, -5)$ and $R(4, 5)$.
(CBSE 2019-20, 3 marks)
46. If the point $C(-1, 2)$ divides internally the line segment joining $A(2, 5)$ and $B(x, y)$ in the ratio $3 : 4$, find the coordinates of B .
(CBSE 2019-20, 3 marks)
47. If $A(3, \sqrt{3})$, $B(0, 0)$ and $C(3, k)$ are the three vertices of an equilateral triangle ABC , then the value of k is
(A) 2 (B) -3
(C) $-\sqrt{3}$ (D) $-\sqrt{2}$
(CBSE 2021-22, TERM-I, 1 mark)
48. Three vertices of a parallelogram $ABCD$ are $A(1, 4)$, $B(-2, 3)$ and $C(5, 8)$. The ordinate of the fourth vertex D is
(A) 8 (B) 9
(C) 7 (D) 6
(CBSE 2021-22, TERM-I, 1 mark)
49. Points $A(-1, y)$ and $B(5, 7)$ lie on a circle with centre $O(2, -3y)$. The values of y are
(A) 1, -7 (B) -1, 7
(C) 2, 7 (D) -2, -7
(CBSE 2021-22, TERM-I, 1 mark)
50. The ratio in which the line $3x + y - 9 = 0$ divides the line segment joining the points $(1, 3)$ and $(2, 7)$ is
(A) $3 : 2$ (B) $2 : 3$
(C) $3 : 4$ (D) $4 : 3$
(CBSE 2021-22, TERM-I, 1 mark)
51. If $A(4, -2)$, $B(7, -2)$ and $C(7, 9)$ are the vertices of a $\triangle ABC$, then $\triangle ABC$ is
(A) equilateral triangle (B) isosceles triangle
(C) right angled triangle (D) isosceles right angled triangle
(CBSE 2021-22, TERM-I, 1 mark)
52. The line segment joining the points $P(-3, 2)$ and $Q(5, 7)$ is divided by the y -axis in the ratio
(A) $3 : 1$ (B) $3 : 4$
(C) $3 : 2$ (D) $3 : 5$
(CBSE 2021-22, TERM-I, 1 mark)
53. The base BC of an equilateral $\triangle ABC$ lies on the y -axis. The co-ordinates of C are $(0, -3)$. If the origin is the mid-point of the base BC , what are the co-ordinates of A and B ?
(A) $A(\sqrt{3}, 0)$, $B(0, 3)$ (B) $A(\pm 3\sqrt{3}, 0)$, $B(3, 0)$
(C) $A(\pm 3\sqrt{3}, 0)$, $B(0, 3)$ (D) $A(-\sqrt{3}, 0)$, $B(3, 0)$
(CBSE 2022-23, 1 mark)
54. The distance of the point $(-6, 8)$ from x -axis is _____.
(A) 6 units (B) -6 units
(C) 8 units (D) 10 units
55. The point of intersection of the line represented by $3x - y = 3$ and y -axis is given by
(A) $(0, -3)$ (B) $(0, 3)$
(C) $(2, 0)$ (D) $(-2, 0)$
(CBSE 2022-23, 1 mark)

56. In what ratio, does x-axis divide the line segment joining the points A(3, 6) and B(-12, -3)?
(CBSE 2022-23, 1 mark)
- (A) 1 : 2 (B) 1 : 4
(C) 4 : 1 (D) 2 : 1
57. The end-points of a diameter of a circle are (2, 4) and (-3, -1). The radius of the circle is ____.
(CBSE 2022-23, 1 mark)
- (A) $2\sqrt{5}$ (B) $\frac{5}{2}\sqrt{5}$
(C) $\frac{5}{2}\sqrt{2}$ (D) $5\sqrt{2}$
58. y-axis divides the line segment joining the points (-6, 2) and (2, -6) in the ratio:
(A) 1 : 3 (B) 3 : 2
(C) 3 : 1 (D) 2 : 3
(CBSE 2022-23, 1 mark)
59. The distance of the point (-1, 7) from x-axis is:
(A) -1 (B) 7
(C) 6 (D) $\sqrt{50}$
(CBSE 2022-23, 1 mark)
60. The lines represented by the linear equations $y = x$ and $x = 4$ intersect at P. The coordinates of the point P are:
(CBSE 2022-23, 1 mark)



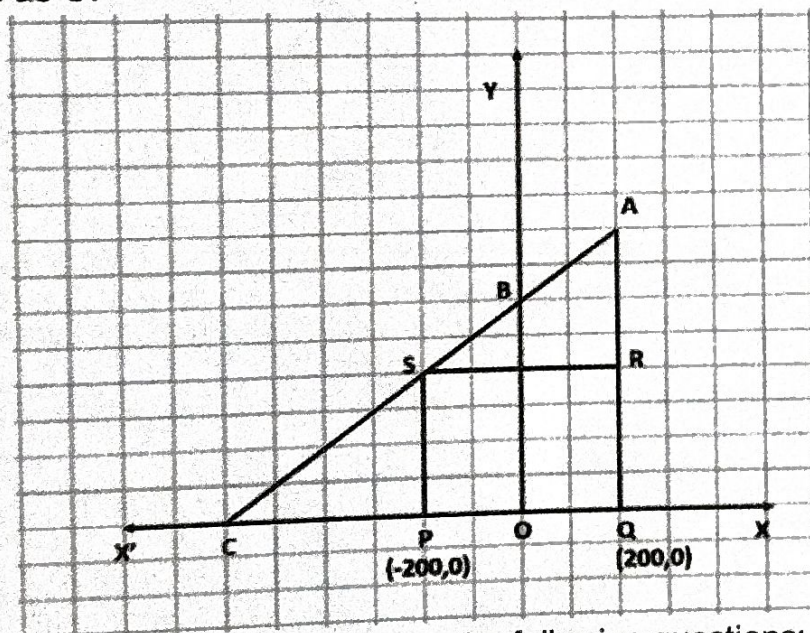
- (A) (4, 0) (B) (4, 4)
(C) (0, 4) (D) (-4, 4)
61. The distance of the point (-6, 8) from origin is:
(A) 6 (B) -6
(C) 8 (D) 10
(CBSE 2022-23, 1 mark)

DIRECTIONS (62): In the question number 9, a statement of **Assertion (A)** is followed by a statement of **Reason (R)**. Choose the correct option out of the following:

- (A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
(B) Both Assertion (A) and Reason (R) are true and Reason (R) is not the correct explanation of Assertion (A).
(C) Assertion (A) is true but Reason (R) is false.
(D) Assertion (A) is false but Reason (R) is true.
62. **Assertion (A):** Point P(0, 2) is the point of intersection of y-axis with the line $3x + 2y = 4$.
Reason (R): The distance of point P(0, 2) from x-axis is 2 units.
(CBSE 2022-23, 1 mark)



63. A line intersects y-axis and x-axis at point P and Q, respectively. If R(2, 5) is the mid-point of line segment PQ, then find the coordinates of P and Q.
(CBSE 2022-23, 2 marks)
64. The vertices of a triangle are $(-2, 0)$, $(2, 3)$ and $(1, -3)$. Is the triangle equilateral, isosceles or scalene?
(CBSE 2022-23, 2 marks)
65. Find the value(s) of 'x' so that $PQ = QR$, where the coordinates of P, Q and R are $(6, -1)$, $(1, 3)$ and $(x, 8)$ respectively.
(CBSE 2022-23, 2 marks)
66. Find the ratio in which the line segment joining the points A(6, 3) and B(-2, -5) is divided by x-axis.
(CBSE 2022-23, 3 marks)
67. Show that the points A(-3, 2), B(-5, -5), C(2, -3) and D(4, 4) are vertices of a rhombus ABCD. Is it also a square?
(CBSE 2022-23, 3 marks)
68. Jagdish has a field which is in the shape of a right angled triangle AQC. He wants to leave a space in the form of a square PQRS inside the field for growing wheat and the remaining for growing vegetables (as shown in the figure). In the field, there is a pole marked as O.



Based on the above information, answer the following questions:

- (i) Taking O as origin, coordinates of P are $(-200, 0)$ and of Q are $(200, 0)$. PQRS being a square, what are the coordinates of R and S?
- (ii) (a) What is the area of square PQRS?

OR

- (b) What is the length of diagonal PR in square PQRS?
- (iii) If S divides CA in the ratio K: 1, what is the value of K, where point A is $(200, 800)$?
(CBSE 2022-23, 4 marks)

69. AD is a median $\triangle ABC$ with vertices A(5, -6), B(6, 4) and C(0, 0). Length AD is equal to:
(CBSE 2023-24, 1 Mark)
- (A) $\sqrt{68}$ units
(B) $2\sqrt{15}$ units
(C) $\sqrt{101}$ units
(D) 10 units

70. If the distance between the points $(3, -5)$ and $(x, -5)$ is 15 units, then the value of x is: (CBSE 2023-24, 1 Mark)
- (A) 12, -18 (B) -12, 18 (D) -9, -12
(C) 18, 5
71. The centre of a circle is at $(2, 0)$. If one end of a diameter is at $(6, 0)$, then the other end is at: (CBSE 2023-24, 1 Mark)
- (A) $(0, 0)$ (B) $(4, 0)$
(C) $(-2, 0)$ (D) $(-6, 0)$
72. Point P divides the line segment joining the points $A(4, -5)$ and $B(1, 2)$ in the ratio 5 : 2. Co-ordinates of points P are: (CBSE 2023-24, 1 Mark)
- (A) $\left(\frac{5}{2}, \frac{-3}{2}\right)$ (B) $\left(\frac{11}{7}, 0\right)$
(C) $\left(\frac{13}{7}, 0\right)$ (D) $\left(0, \frac{13}{7}\right)$
73. XOYZ is a rectangle with vertices $X(-3, 0)$, $O(0, 0)$, $Y(0, 4)$ and $Z(x, y)$. The length of its each diagonal is: (CBSE 2023-24, 1 Mark)
- (A) 5 units (B) $\sqrt{5}$ units
(C) $x^2 + y^2$ units (D) 4 units
75. The fourth vertex D of a parallelogram ABCD whose three vertices are $A(-2, 3)$, $B(6, 7)$ and $C(8, 3)$ is: (CBSE 2023-24, 1 Mark)
- (A) $(0, 1)$ (B) $(0, -1)$
(C) $(-1, 0)$ (D) $(1, 0)$

Direction: In Q. No 76 is Assertion and Reason based questions carrying 1 mark each. Two statements are given, one labeled as Assertion (A) and the other is labeled as Reason (R). Select the correct answer to these questions from the codes (A), (B), (C) and (D) as given below: (CBSE 2023-24, 1 Mark)

- (A) Both, Assertion (A) and Reason (R) are true and Reason (R) is correct explanation of Assertion (A).
(B) Both, Assertion (A) and Reason (R) are true and Reason (R) is not correct explanation of Assertion (A).
(C) Assertion (A) is true but Reason (R) is false.
(D) Assertion (A) is false but Reason (R) is true.
76. Assertion (A): Mid-point of a line segment divides the line segment in the ratio 1 : 1.
Reason (R): The ratio in which the point $(-3, k)$ divides the line segment joining the points $(-5, 4)$ and $(-2, 3)$ is 1 : 2.

Direction: In Q. No 77 is Assertion and Reason based questions carrying 1 mark each. Two statements are given, one labeled as Assertion (A) and the other is labeled as Reason (R). Select the correct answer to these questions from the codes (A), (B), (C) and (D) as given below: (CBSE 2023-24, 1 Mark)

- (A) Both, Assertion (A) and Reason (R) are true and Reason (R) is correct explanation of Assertion (A).
(B) Both, Assertion (A) and Reason (R) are true and Reason (R) is not correct explanation of Assertion (A).
(C) Assertion (A) is true but Reason (R) is false.
(D) Assertion (A) is false but Reason (R) is true.

77. Assertion (A): The point which divides the line segment joining the points A(1, 2) and B(-1, 1) internally in the ratio 1 : 2 is $\left(\frac{-1}{3}, \frac{5}{3}\right)$

Reason (R): The coordinates of the point which divides the line segment joining the points A (x_1, y_1) and B (x_2, y_2) in the ratio $m_1 : m_2$ are $\left[\frac{m_1 x_2 + m_2 x_1}{m_1 + m_2}, \frac{m_1 y_2 + m_2 y_1}{m_1 + m_2}\right]$

78. (a) Find the ratio in which the point P(-4, 6) divides the line segment joining the points A(-6, 10) and B(3, -8).
(CBSE 2023-24, 2 Marks)

OR

- (b) Prove that the points (3, 0), (6, 4) and (-1, 3) are the vertices of an isosceles triangle.
79. Find the type of triangle ABC formed whose vertices are A(1, 0), B(-5, 0) and C(-2, 5).
(CBSE 2023-24, 2 Marks)

80. (a) In what ratio is the line segment joining the points (3, -5) and (-1, 6) divided by the line $y = x$?

OR

- (b) A(3, 0), B(6, 4) and C(-1, 3) are vertices of a triangle ABC. Find length of its median BE.
(CBSE 2023-24, 2 Marks)

81. (a) Find a relation between x and y such that the point P(x, y) is equidistant from the points A(7, 1) and B(3, 5).
(CBSE 2023-24, 2 Marks)

OR

- (b) Points A(-1, y) and B(5, 7) lie on a circle with centre O(2, -3y) such that AB is a diameter of the circle. Find the value of y. Also, find the radius of the circle.

82. (a) Find the ratio in which the point $\left(\frac{8}{5}, y\right)$ divides the line segment the points (1, 2) and (2, 3).
(CBSE 2023-24, 3 Marks)
Also, find the value of y.

OR

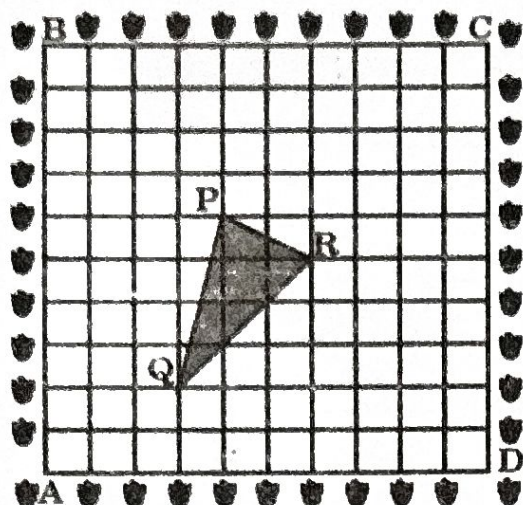
- (b) ABCD is a rectangle formed by points A(-1, -1), B(-1, 6), C(3, 6) and D(3, -1). P, Q, R and S are mid-points of sides AB, BC, CD and DA respectively. Show that diagonals of the quadrilateral PQRS bisect each other.
83. (a) Find the ratio in which the line segment joining the points (5, 3) and (-1, 6) is divided by Y-axis.
(CBSE 2023-24, 3 Marks)

OR

- (b) P(-2, 5) and Q(3, 2) are two points. Find the coordinates of the point R on line segment PQ such that $PR = 2QR$.

Case Study

84. A garden is in the shape of a square. The gardener grew saplings of Ashoka tree on the boundary of the garden at the distance of 1 m from each other. He wants to decorate the garden with rose plants. He chose a triangular region inside the garden to grow rose plants. In the above situation, the gardener took help from the students of class 10. They made a chart for it which looks like the given figure.
(CBSE 2023-24, 4 Marks)



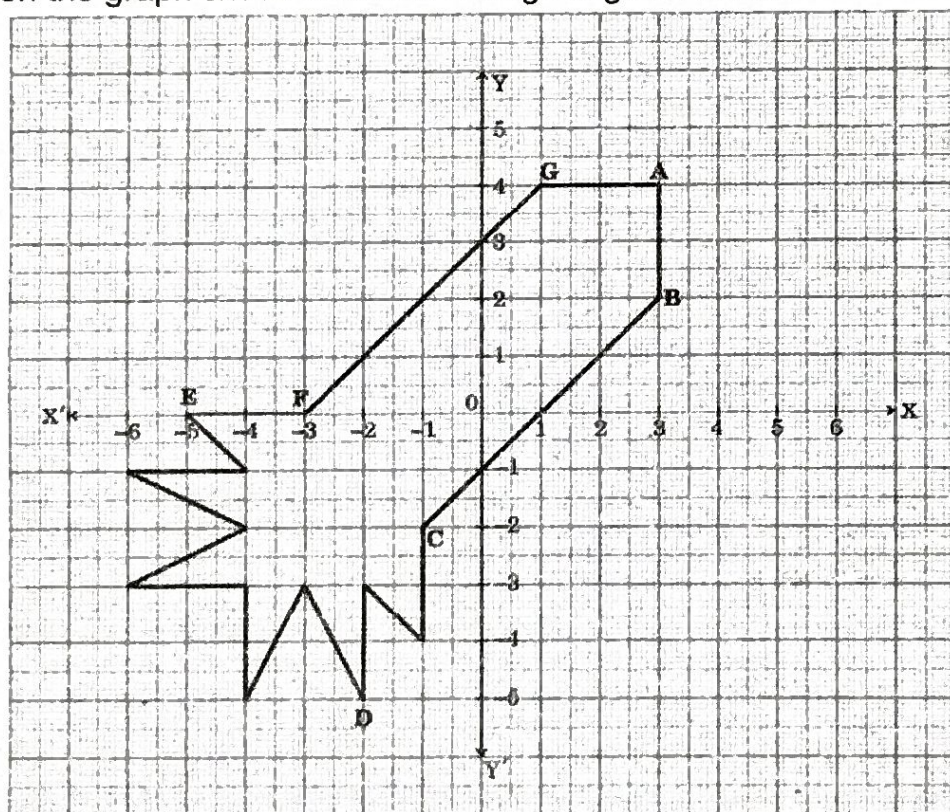
Based on the above, answer the following questions:

- (i) If A is taken as origin, what are the coordinates of the vertices of ΔPQR ?
- (ii) (a) Find distances PQ and QR.

OR

- (b) Find the coordinates of the point which divides the line segment joining points P and R in the ratio 2 : 1 internally.
- (iii) Find out if ΔPQR is an isosceles triangle.

85. Ryan, from a very age, was fascinated by the twinkling of stars and the vastness of space. He always dreamt of becoming an astronaut one day. So he started to sketch his own rocket designs on the graph sheet. One such design is given below: **(CBSE 2023-24, 4 Marks)**



Based on the above, answer the following questions:

- (i) Find the mid-point of the segment joining F and G.
- (ii) (a) What is the distance between the points A and C?

OR

- (b) Find the coordinates of the point which divides the line segment joining the points A and B in the ratio 1 : 3 internally.
- (iii) What is the coordinates of the point D?