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Chapter

Co-ordinate Geometry

Key Points

1. Let XOX′ and YOY′ are two mutually perpendicular lines. These lines are called co-ordinate axis. XOX′ is called *x*-axis and YOY′ is called y-axis.
2. Point of intersection of *x*-axis and y-axis i.e. O is called the origin whose coordinates are (0,0).
3. *x*-coordinate of a point is called abscissa & y-coordinate is called the ordinate.
4. A plane is divided by the axis in four quadrants.
   (i) In first quadrant, both *x* and *y* coordinates of a point are +ve.
   (ii) In second quadrant, *x*-coordinate is –ve and *y*-coordinates is +ve.
   (iii) In third quadrant, both *x* and *y* coordinates of a point are negative.
   (iv) In fourth quadrant, *x*-coordinate is +ve and y-coordinate is –ve.
5. **Distance formula**

   Distance between two points $\mathbf{P}(x_1, y_1)$ and $\mathbf{Q}(x_2, y_2)$ **is** $\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$ units.
6. Point A, B, and C are collinear if they lie on the same straight line.
7. Midpoint of a line segment joining. the points (x_1, y_1) and (x_2, y_2) is given by $\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$.
8. **Section formula**

   The coordinates of a point which divides the line segment joining the points (x_1, y_1) and (x_2, y_2) in the ratio *l*:*m* internally are given by $\left(\frac{lx_2 + mx_1}{l + m}, \frac{ly_2 + my_1}{l + m}\right)$.

9. The area of the triangle with vertices (x_1, y_1), (x_2, y_2) and (x_3, y_3) is given by $\frac{1}{2}[x_1(y_2 - y_3) + x_2(y_3 - y_1) + x_3(y_1 - y_2)]$sq. units. If the area of triangle is zero then points are collinear.
10. Centroid of the triangle with vertices $(x_1; y_1)$, (x_2, y_2) and (x_3, y_3) is given by $\left(\frac{x_1 + x_2 + x_3}{3}, \frac{y_1 + y_2 + y_3}{3}\right)$.

VERY SHORT ANSWER TYPE QUESTIONS

1. What is the distance of points A(5,–7) from y-axis.
2. If the distance between the points (x , 2) and (3,–6) is 10 units, what is the positive value of x.
3. Find the co-ordinates of the midpoint of the line segment joining points (4,7) and (2,–3).
4. Find the co-ordinates of the point where the line $\frac{x}{2} + \frac{y}{3} = 5$ intersects y-axis.
5. If A and B are respectively the points (–6,7) and (–1,–5) then find the value of 2AB.
6. A parallel line is drawn from point P(5,3) to y-axis, what is the distance between the line and y-axis.
7. Find the distance between the lines $3x + 6 = 0$ and $x - 7 = 0$.
8. The midpoint of the line segmrnt AB is (4,0). If the co-ordinates of point A is (3,–2), then find the co-ordinates of point B.
9. What is the ordinate of any point on x-axis?
10. What is the abscissa of any point on y-axis?
11. What is the distance of point (3,2) from x-axis?
12. What is the distance of point (3,–4) from y-axis?
13. What is the distance of point (3,4) from the origin?
14. Find the value of y if the distance between the points A (2, – 3) & B (10, y) is 10 units.
15. Find the co-ordinates of a points on x-axis which is equidistant from the points (–2,5) and (2,–3).

SHORT ANSWER TYPE (I) QUESTIONS

16. For what value of P, the points (2,1), (p,–1) and (–1,3) are collinear?
17. Find the area of ΔPQR whose vertices are P(–5,7), Q(–4,–5) and R(4,5).
18. Find the point of trisection of the line segment joining the points (1,–2) and (–3,4).
19. The midpoints of the sides of a triangle are (3,4),(4,1) and (2,0). Find the vertices of the triangle.
20. Find the value of x if the points A (4,3) and B(x,5) lie on a circle whose centre is O(2,3).
21. Find the ratio in which x-axis divides the line segment joining the points (6,4) and (1,–7).
22. Show that the points (–2,3),(8,3) and (6,7) are the vertices of a right angle triangle.
23. Find the point on the y-axis which is equidistant from the points (5,–2) and (–3,2).
24. Find the ratio in which y-axis divides the line segment joining the points A(5,–6) and B(–1, –4).
25. Find the co-ordinates of a centroid of a triangle whose vertices are (3,–5), (–7,4) and (10,–2).

SHORT ANSWER TYPE (II) QUESTIONS

26. Show that the points A(2,–2), B(14,10), C(11,13) and D(–1,1) are the vertices of a rectangle.
27. Show that the points A(5,6),B(1,5),C(2,1) and D(6,2) are the vertices of a square.
28. The point R divides the line segment AB, whose A(–4,0) and B(0,6) are such that . $AR = \frac{3}{4} AB$
29. Three consecutive vertices of a parallelogram are (–2, –1), (1,0) and (4, 3). Find the coordinates of fourth vertex.
30. If the distance of P(x,y) from the points A(3,6) and B(–3,4) are equal, prov that $3x + y = 5$.
31. Two vertices of a triangle are (1,2) and (3,5). If the centroid of the triangle is at origin, find the co-ordinates of the third vertex.

32. If P(x,y) is any point on the line joining the points A(a,0) and B(0,b) then show that . $\frac{x}{a}+\frac{y}{b}=1$

33. 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 line give by $2x-y+k=0$, find the value of k.

34. If (3, 3), (6, y), (x, 7) and (5, 6) are the vertices of a parallelogram taken in order, find the value of x and y.

35. It the vertices of a triangle are (1, –3),(4, p) and (–9, 7) and its area is 15 sq units, find the value of p.

LONG ANSWER TYPE QUESTIONS

36. Find the values of a and b if the points A(–2,1), B(a,b) and C(4,–1) are collinear and $a-b=1$.

37. If a point A(0,2) is equidistant from the points B(3,p) and C(p,5) then find value of p and the length of AB.

38. To solve a riddle a girl is asked to join the three points A(7, 5), B(2, 3) and C(6, –7) with a sketchpen. After joining these points a triangle is obtained by her. What type of triangle is it? What values are depicted in the question?

39. The coordinates of the houses of Mona and Nishi are (7, 3) and (4, –3) respectively. The coordinates of their school are (2, 2). If they both start for school at the same time in the morning and reaches at the same time, who walks fast?

40. A teacher asked three students to stand to form a triangle at the points P (–1, 3), Q (1,–1) and R (5, 1). Suddenly a fourth boy came and shows his interest in participating the activity. She asked him to stand at points mid way between Q and R. What is his distance from P.

41. Point P divides the line segment joining the points A (2, 1) and B (5, – 8) such that $\frac{AP}{AB}=\frac{1}{3}$. If P lies on the line $2x-y+k=0$, Find the value of k.

ANSWERS

1. 5
2. 9
3. (3,2)
4. 15
5. 26
6. 3
7. 9
8. (5,2)
9. 0
10. 0
11. 2 units
12. 3 units
13. 5 units
14. 3 or – 9
15. (–2,0)
16. 5
17. 53 sq. units
18. $\left(\frac{-5}{3},2\right),\left(\frac{-1}{3},0\right)$
19. (1,3),(5,5),(3,–3)
20. 2
21. 4:7
23. (0,–2)
24. 5:1
25. (2,–1)
28. $\left(-1,\frac{9}{2}\right)$
29. (1,2)
31. (–4,–7)
33. $k = -8$
34. $x = 8$, $y = 4$
35. $p = -3$
36. $a = 1$, $b = 0$
37. P = 1, AB = $\sqrt{10}$ units
38. Right Angled Triangle
39. Nishi
40. 5 Units
41. –8

Practice Test

Coordinate Geometry

Time: 50 Minutes **M.M. : 20**

SECTION-A

1. Find the value of m in which the points (3, 5), (m, 6) and are $\left(\frac{1}{2}, \frac{15}{2}\right)$ collinear. **1**

2. What is the distance between the points A(c, 0) and B(0, $-c$). **1**

SECTION-B

3. For what value of p, the points (-3, 9), (2, p) and (4, -5) are collinear. **2**

4. If the points A(8, 6) and B(x, 10) lie on the circle whose centre is (4, 6) then find the value of x. **2**

SECTION-C

5. Show that the points A(-3, 2), B(-5, -5), C(2, -3) and D(4, 4) are the vertices of a rhombus. **3**

6. Find the ratio in which the point (2, y) divides the line segment joining the points A(-2, 2) and B(3, 7). Also find the value of y. **3**

SECTION-D

7. If the point P divides the line segment joining the points A(-2, -2) and B(2, -4) such that $\frac{AP}{AB} = \frac{3}{7}$, then find the coordinate of P. **4**

8. If A(-5, 7), B(-4, -5), C(-1, -6) and D(4, 5) are the vertices of a parallelogram taken in order then find the area. **4**