

Co-ordinate Geometry

Key Points

- 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.
- Point of intersection of x -axis and y -axis i.e. O is called the origin whose coordinates are $(0,0)$.
- x -coordinate of a point is called abscissa & y -coordinate is called the ordinate.
- A plane is divided by the axis in four quadrants.
 - In first quadrant, both x and y coordinates of a point are +ve.
 - In second quadrant, x -coordinate is -ve and y -coordinates is +ve.
 - In third quadrant, both x and y coordinates of a point are negative.
 - In fourth quadrant, x -coordinate is +ve and y -coordinate is -ve.

5. Distance formula

Distance between two points $P(x_1, y_1)$ and $Q(x_2, y_2)$ is $\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$ units.

- Point A , B , and C are collinear if they lie on the same straight line.
- 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 $\left(\frac{x_1 + x_2 + x_3}{3}, \frac{y_1 + y_2 + y_3}{3} \right)$.

SECTION-A (1 MARK EACH)

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 segment 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 $(2,-3)$.

SECTION-B (2 MARKS EACH)

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 $(10,-2)$.

SECTION-C (3 MARKS EACH)

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 given 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. If 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 .

SECTION-D (4 MARK EACH)

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? What values are depicted from the question?
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 point mid way between Q and R . What is his distance from P . What values of the teacher appears when she agreed the fourth boy to participate?
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)
26. $\left(-1, \frac{9}{2}\right)$
28. (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. (a) Right Angled Triangle (b) Sports, Activeness, Critical thinking.
39. (a) Mona, (b) Time bound, Reality
40. 5 Units, interest in Mathematics, Friendship, Cooperation
41. -8

Practice Test

Coordinate Geometry

Time: 50 minutes

M.M: 20

SECTION-A

1. Find the area of triangle whose vertices are $(-2, 3)$, $(8, 3)$ and $(6, 7)$.
2. Find the value of m in which the points $(3, 5)$, $(m, 6)$ and $\left(\frac{1}{2}, \frac{15}{2}\right)$ are collinear.
3. What is the distance between the points $A(c, 0)$ and $B(0, -c)$?
4. For what value of p , the points $(-3, 9)$, $(2, p)$ and $(4, -5)$ are collinear.
5. 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 .
6. Show that the points $A(-3, 2)$, $B(-5, -5)$, $C(2, -3)$ and $D(4, 4)$ are the vertices of a rhombus.
7. 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 .
8. 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 .
9. 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.