CO-ORDINATE GEOMETRY

IMPORTANT CONCEPTS
TAKE A LOOK

1. **Distance Formula**:-

   The distance between two points $A(x_1,y_1)$ and $B(x_2,y_2)$ is given by the formula.

   $AB=\sqrt{(X_2-X_1)^2+(Y_2-Y_1)^2}$

   COROLLARY:- The distance of the point P(x,y) from the origin 0(0,0) is give by

   $OP=\sqrt{(X-0)^2+(Y-0)^2}$ ie $OP=\sqrt{X^2+Y^2}$

2. **Section Formula :-**

   The co-ordinates of the point P(x,y) which divides the line segment joining $A(x_1,y_1)$ and B(x2,y2) internally in the ratio m:n are given by .

   $$x=\frac{mx_2+nx_1}{m+n} \qquad y=\frac{my_2+ny_1}{m+n}$$

3. **Midpoint Formula:-**

   If R is the mid-point, then $m_1=m_2$ and the coordinates of R are

   $$R\left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right)$$

4. **Co-ordinates of the centroid of triangle:-**

   The co-ordinates of the centroid of a triangle whose vertices are $P(x_1,y_1)$, $Q(x_2,y_2)$ and $R(x_3,y_3)$ are

   $$\left(\frac{x_1+x_2+x_3}{3}, \frac{y_1+y_2+y_3}{3}\right)$$

5. **Area of a Triangle:-**

   The area of the triangle formed by the points $P(x_1,y_1)$ $Q(x_2,y_2)$ and $R(x_3,y_3)$ is the numerical value of the expression.

   $$ar(\Delta PQR)=1/2\left[x_1(y_2-y_3)+x_2(y_3-y_1)+x_3(y_1-y_2)\right]$$

LEVEL-I

1. Find the distance of the points (6,-6) from origin. Ans-$6\sqrt{2}$ units
2. Show that the point (1,1)(-2,7) and (3,-3) are collinear.
3. Find the distance between the points R(a+b , a-b)and S(a-b, -1-b) Ans-$2\sqrt{a^2+b^2}$ units
4. Find the point on x-axis which is equidistant from (2,-5) and (-2,9). Ans- x=-7
5. Find the area of the triangle whose vertices(-5,-1),(3,-5)(5,2) Ans-32 sq units

LEVEL-II

1. Show that the points (-2,5), (3,-4) and (7,10) are the vertices of a right angled isosceles triangle.
2. Find a relation between x and y if the points (x,y),(1,2) and (7,0) are collinear.
   Ans : x+3y =7
3. Find the point on y axis which is equidistance from the points (5,-2) and (-3,2) Ans-(0,-2)
4. 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. Ans-2
5. Find the value of 'k' for which the points (7,-2),(5;1) and (3,k) are collinear. Ans-k=4
6. Find the area of triangle whose vertices are (2,-4),(-1,0) and (2,4) Ans-12 sq.units
7. Find the ratio in which line segment joining the points (6,4) and (1,-7) is divided by x-axix also find the coordinates of the points of division. Ans 7:4 and (46/11, 0)

LEVEL-III

1. Show that the points (7,10),(-2,5) and (3,-4) are the vertices of an isosceles right triangle.
2. In what ratio does the line x-y-2=0 divide the line segment joining (3,-1) and (8,9)? Also find the coordinates of the point of intersection. Ans-(2:3)(5,3)
3. Three consecutive vertices of a parallelogram are (-2,-1),(1,0) and (4,3). Find the coordinates of the fourth vertex. Ans-(1,2)
4. Show that the points A(5,6); B(1,5); C(2,1) and D(6,2) are the vertices of a square.
5. The vertices of a triangle are (-1,3),(1,-1) and (5,1). Find the length of medians through vertices (-1,3) and (5,1) Ans-(5,5)
6. Find the value of P for which the points (-5,1),(1,P) and (4,-2) are collinear.
   Ans P=-1

SELF EVALUATION QUESTION

1. Find the distance between points.
   a. A(6,0) B(14,0)
   b. A(0,-5) B(0,10)
   c. A(0,p) B(P,0)
2. Show that the points (-1,-1),(1,1) and (-√3, √3) are the vertices of an equilateral triangle.
3. The line joining the points A(4,-5) and B(4,5) is divided by the point P such that AP/AB=2/5. Find the coordinates of P.
4. Find the coordinates of the points which trisect the line segment joining (1,-2) and (-3,4).
5. Determine the ratio in which the line 2x+y=4 divides the line segment joining the points (2,-2) and (3,7).
6. Find the value of K such that the point (0,2) is equidistant from the points (3,k) and (k,5).
7. Prove that the points (4,5),(7,6),(6,3) and (3,2) are the vertices of a parallelogram. Is it a rectangle?