Coordinate Geometry
for
ICSE and CBSE

1. A point P is at a distance $\sqrt{13}$ units from the point (-1,3). Find the coordinate of the point P if its $y-coordinate$ is same as $x-coordinate$.
2. If the point (x,y) is equidistant from the points $(a+b,b-a)$ and $(a-b,b+a)$ prove that $bx=ay$.
3. Show that the points $(a,a),(-a.-a)$ & $\left(-\sqrt{3}a,\sqrt{3}a\right)$ are vertices of an equilateral triangle. Find its area. Ans: $2\sqrt{3}a^2\ sq.units$
4. If the opposite vertices of a square are (1,-1) and (3,4), find the coordinates of the remaining two vertices. Ans: $\left(-\frac{1}{2},\frac{5}{2}\right),\left(\frac{9}{2},\frac{1}{2}\right)$
5. If a is the length of one of the sides of an equilateral triangle ABC, base BC lies on x-axis and vertex B at the origin, find the coordinates of the vertices of the triangle ABC.
6. If (7,1), (x,9) and (-1,y) are three concyclic points whose centre is (3,4), find the possible values of x and y. Ans: x=3, y=1,7
7. If the points $(x,y),(a,0)$ & $(0,b)$ are collinear then show that $\frac{x}{a}+\frac{y}{b}=1$.
8. Show that the line segment joining the points $(-3,5)$ and $\left(6,-\frac{5}{2}\right)$ is trisected by the coordinate axes.
9. Find the coordinates of the centroid of a triangle whose mid-points of the sides are $(-1,6),(5,6)$ & $(2,0)$.
10. Find the area of a rhombus if its vertices are $(2,-1),(3,4),(-2,3)$ and $(-3,-2)$ taken in order. Ans: $24sq.units$
11. Show that the points $(-3,5),(3,1),(0,3)$ and $(-1,-4)$ do not form a quadrilateral.
12. Three consecutive vertices of a parallelogram are $(a+b,a-b),(2a+b,2a-b)$ and $(a-b,a+b)$. Find the fourth vertex of the parallelogram. Ans: $(-b,b)$
13. The centre of a circle is at (2,6) and a chord of this circle of length 24 units is bisected at (-1,2). Find the radius of the circle. Ans: 13 units
14. Show that the straight lines joining the mid-points of the opposite sides of a quadrilateral bisect each other.
15. Find the lengths of the medians of the triangle whose vertices are (2,-4), (6,-2) and (-4,2). Ans: $\sqrt{89},\sqrt{17}\ \&\ 5\sqrt{2}\quad units$

Important Results

1. A quadrilateral is a parallelogram if its opposite side are equal

2. A quadrilateral is a rectangle if its opposite side are equal and diagonals are equal
3. A quadrilateral is a square if its all sides are equal and diagonals are equal
4. A quadrilateral is a rhombus if its all sides are equal
5. Diagonals of parallelogram, rectangle, rhombus and square bisects each other
6. Centroid is the point of intersections of the medians, dividing each median in the ratio 2:1
7. Orthocenter is the point of intersection of perpendiculars from the vertices
8. The centre of a circle which passes through the vertices of a given polygon, usually a triangle is the circumcentre. Circumcentre is equidistant from the vertices.
9. A median in a triangle is the line segment drawn from a vertex to the midpoint of its opposite side. Every triangle has three medians
10. Every triangle has three bases (any of its sides) and three altitudes (heights). Every altitude is the perpendicular segment from a vertex to its opposite side (or the extension of the opposite side)

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