

COORDINATE GEOMETRY

Points to Remember

- The area of a triangle formed by the points (x_1, y_1) , (x_2, y_2) and (x_3, y_3) is $\frac{1}{2} \{(x_1y_2 + x_2y_3 + x_3y_1) - (x_2y_1 + x_3y_2 + x_1y_3)\}$ sq.units
- Three points $A(x_1, y_1)$, $B(x_2, y_2)$ and $C(x_3, y_3)$ are collinear if and only if
 - (i) area of $\triangle ABC = 0$ or $x_1y_2 + x_2y_3 + x_3y_1 = x_2y_1 + x_3y_2 + x_1y_3$
 - (ii) slope of $AB =$ slope of BC or slope of AC
- The area of a quadrilateral formed by the four points (x_1, y_1) , (x_2, y_2) , (x_3, y_3) and (x_4, y_4) is $\frac{1}{2} \{(x_1y_2 + x_2y_3 + x_3y_4 + x_4y_1) - (x_2y_1 + x_3y_2 + x_4y_3 + x_1y_4)\}$ sq.units.
- If a line makes an angle θ with the positive direction of X axis, then its slope $m = \tan \theta$.
- If $A(x_1, y_1)$, $B(x_2, y_2)$ are two distinct points then the slope of AB is $\frac{y_2 - y_1}{x_2 - x_1}$.
- Slope of line $ax + by + c = 0$ is $m = \frac{-a}{b}$.

Equation of straight line in various forms

Form	Name	Form	Name
$ax + by + c = 0$	General form	$\frac{x}{a} + \frac{y}{b} = 1$	Intercept form
$y - y_1 = m(x - x_1)$	Point-slope form	$x = c$	Parallel to Y axis
$y = mx + c$	Slope-intercept	$y = b$	Parallel to X axis
$\frac{y - y_1}{y_2 - y_1} = \frac{x - x_1}{x_2 - x_1}$	Two point form		

- Two straight lines are parallel if and only if their slopes are equal.
- Two straight lines with well defined slopes m_1 , m_2 are perpendicular if and only if $m_1 \times m_2 = -1$.