

Equations of the straight line that passes through the point  $P(x_0, y_0)$  and has the direction vector  $\vec{V}(v_x, v_y)$ .

<b>Vector equation</b>	$(x, y) = (x_0, y_0) + t (v_x, v_y)$	
<b>Parametric equations</b>	$\left. \begin{aligned} x &= x_0 + v_x t \\ y &= y_0 + v_y t \end{aligned} \right\}$	
<b>Standard form</b>	$Ax + By + C = 0$	
<b>Slope-Intercept form</b>	$y = m x + n$ , Where $m = \text{slope}$ , $n = \text{y-intercept}$	
<b>Point-Slope form</b>	$y - y_0 = m (x - x_0)$	
<b>Angle between lines</b>	Lines come in general form: $\cos \alpha = \frac{ A \cdot A' + B \cdot B' }{\sqrt{A^2 + B^2} \sqrt{A'^2 + B'^2}}$	If we know the slopes $\tan \alpha = \left  \frac{m - m'}{1 + m m'} \right $
<b>Perpendicular distance from the point <math>P(x_0, y_0)</math> to the line <math>Ax + By + C = 0</math></b>	$d = \frac{ Ax_0 + By_0 + C }{\sqrt{A^2 + B^2}}$	
<b>Parallel lines</b>	Lines come in general form: $\frac{A}{A'} = \frac{B}{B'}$	If we know the slopes: $m = m'$
<b>Perpendicular lines</b>	Lines come in general form $A \cdot A' + B \cdot B' = 0$	If we know the slopes: $m \cdot m' = -1$
<b>Director vector of a line</b>	General form: $Ax + By + C = 0$ Slope-intercept form: $y = m x + n$ If slope is rational: $m = \frac{a}{b}$	$\vec{V}(-B, A)$ $\vec{V}(1, m)$ $\vec{V}(b, a)$
<b>Slope, angle of slope and director vector <math>\vec{V}(v_x, v_y)</math></b>	$m = \tan \alpha = \frac{v_y}{v_x}$	