

Fill in the Blanks

Vector Equation of a Line in 2D

1 st Point on the Line	2 nd Point on the Line	Direction Vector	Vector Equation of the Line	Cartesian Equation of the Line
(3, 1)	(2, -5)	$\begin{pmatrix} -1 \\ -6 \end{pmatrix}$	$r = \begin{pmatrix} 3 \\ 1 \end{pmatrix} + \lambda \begin{pmatrix} -1 \\ -6 \end{pmatrix}$	$\frac{x-3}{-1} = \frac{y-1}{-6}$
(6, 8)	e.g. (11, 6)	$\begin{pmatrix} 5 \\ -2 \end{pmatrix}$	$r = \begin{pmatrix} 6 \\ 8 \end{pmatrix} + \lambda \begin{pmatrix} 5 \\ -2 \end{pmatrix}$	$\frac{x-6}{5} = \frac{y-8}{-2}$
(-2, -4)	e.g. (1, 3)	$\begin{pmatrix} 3 \\ 7 \end{pmatrix}$	$r = \begin{pmatrix} -2 \\ -4 \end{pmatrix} + \lambda \begin{pmatrix} 3 \\ 7 \end{pmatrix}$	$\frac{x+2}{3} = \frac{y+4}{7}$
(1, -5)	e.g. (1, 3)	$\begin{pmatrix} 3 \\ 7 \end{pmatrix}$	$r = \begin{pmatrix} 1 \\ -5 \end{pmatrix} + \lambda \begin{pmatrix} 2 \\ -3 \end{pmatrix}$	$\frac{x-1}{2} = \frac{y+5}{-3}$
(-9, 2)	(-7, 3)	$\begin{pmatrix} 1 \\ 2 \end{pmatrix}$	$r = \begin{pmatrix} -9 \\ 2 \end{pmatrix} + \lambda \begin{pmatrix} 1 \\ 2 \end{pmatrix}$	$x+9 = \frac{y-2}{2}$
(-5, 0)	e.g. (-11, 3)	$\begin{pmatrix} -6 \\ 3 \end{pmatrix}$	$r = \begin{pmatrix} -5 \\ 0 \end{pmatrix} + \lambda \begin{pmatrix} -6 \\ 3 \end{pmatrix}$	$\frac{x+5}{-6} = \frac{y}{3}$
(-3, 2)	e.g. (-2, 3)	$\begin{pmatrix} 1 \\ 1 \end{pmatrix}$	$r = \begin{pmatrix} -3 \\ 2 \end{pmatrix} + \lambda \begin{pmatrix} 1 \\ 1 \end{pmatrix}$	$x+3 = y-2$
(4, 7)	e.g. (-1, 8)	$-5\mathbf{i} + \mathbf{j}$	$r = \begin{pmatrix} 4 \\ 7 \end{pmatrix} + \lambda \begin{pmatrix} -5 \\ 1 \end{pmatrix}$	$\frac{x-4}{-5} = y-7$
(2, 9)	e.g. (-1, 11)	$\begin{pmatrix} -3 \\ 2 \end{pmatrix}$	$r = (2-3\lambda)\mathbf{i} + (9+2\lambda)\mathbf{j}$	$\frac{x-2}{-3} = \frac{y-9}{2}$
(0, 6)	e.g. (-7, 9)	$\begin{pmatrix} -7 \\ 3 \end{pmatrix}$	$r = \begin{pmatrix} -7\lambda \\ 6+3\lambda \end{pmatrix}$	$\frac{x}{-7} = \frac{y-6}{3}$
$(\sqrt{3}, -1)$	e.g. (11, 6)	$\begin{pmatrix} 4 \\ \sqrt{3} \end{pmatrix}$	$r = \begin{pmatrix} \sqrt{3} \\ -1 \end{pmatrix} + \lambda \begin{pmatrix} 4 \\ \sqrt{3} \end{pmatrix}$	$\frac{x-\sqrt{3}}{4} = \frac{y+1}{\sqrt{3}}$
$(a, -a)$	$(4a, 3a)$	$\begin{pmatrix} 3a \\ 4a \end{pmatrix}$	$r = \begin{pmatrix} a \\ -a \end{pmatrix} + \lambda \begin{pmatrix} 3a \\ 4a \end{pmatrix}$	$\frac{x-a}{3a} = \frac{y+a}{4a}$