

## Worked example

Find the Cartesian equation of the line with vector

$$\text{equation } \mathbf{r} = \begin{pmatrix} -4 \\ 2 \\ 3 \end{pmatrix} + \lambda \begin{pmatrix} 1 \\ -2 \\ -5 \end{pmatrix}.$$

Find the Cartesian equation of the line with vector

$$\text{equation } \mathbf{r} = \begin{pmatrix} -2 \\ 0 \\ 5 \end{pmatrix} + \lambda \begin{pmatrix} -1 \\ 2 \\ 3 \end{pmatrix}.$$

## Your turn

Find the Cartesian equation of the line with vector

$$\text{equation } \mathbf{r} = \begin{pmatrix} 4 \\ 3 \\ -2 \end{pmatrix} + \lambda \begin{pmatrix} -1 \\ 2 \\ 5 \end{pmatrix}.$$

$$\frac{x - 4}{-1} = \frac{y - 3}{2} = \frac{z + 2}{5}$$

Find the Cartesian equation of the line with vector

$$\text{equation } \mathbf{r} = \begin{pmatrix} 2 \\ 5 \\ 0 \end{pmatrix} + \lambda \begin{pmatrix} 1 \\ 3 \\ -2 \end{pmatrix}.$$

$$\frac{x - 2}{1} = \frac{y - 5}{3} = \frac{z}{-2}$$

## Worked example

The Cartesian equation of a line is  $\frac{x+2}{-3} = \frac{y}{-4} = \frac{z-5}{1}$ .  
Find the vector form of the equation of the line.

The Cartesian equation of a line is  $\frac{2-x}{3} = \frac{y+3}{-1} = \frac{5-z}{-4}$ .  
Find the vector form of the equation of the line.

## Your turn

The Cartesian equation of a line is  $\frac{x-2}{3} = \frac{y+5}{-1} = \frac{z}{4}$ .  
Find the vector form of the equation of the line.

$$r = \begin{pmatrix} 2 \\ -5 \\ 0 \end{pmatrix} + \lambda \begin{pmatrix} 3 \\ -1 \\ 4 \end{pmatrix}$$

## Worked example

Show that the points  $A(3, -4, -5)$ ,  $B(-3, 1, -2)$  and  $C(-9, 6, 1)$  are collinear

## Your turn

Show that the points  $A(-3, 4, 5)$ ,  $B(3, -1, 2)$  and  $C(9, 2, -1)$  are collinear

Shown

## Worked example

The Cartesian equation of a line is  $y = 2x - 3$ . Find the vector form of the equation of the line.

The Cartesian equation of a line is  $y = 3x - 2$ . Find the vector form of the equation of the line.

## Your turn

The Cartesian equation of a line is  $y = 3x + 2$ . Find the vector form of the equation of the line.

$$\begin{pmatrix} 0 \\ 2 \end{pmatrix} + \lambda \begin{pmatrix} 1 \\ 3 \end{pmatrix}$$