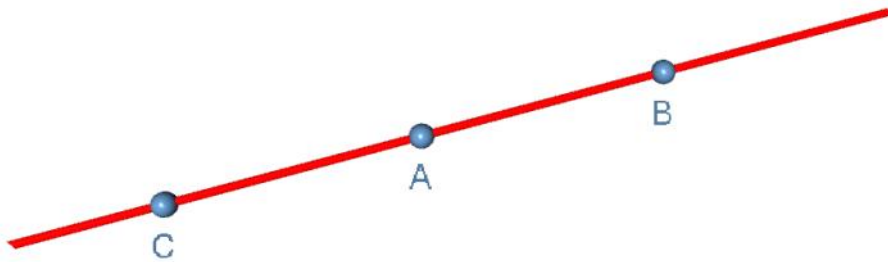


A line L passes through the points A(0,2,-4) and B(3,-3,2)

Point C also lies on the line L. Find the coordinates of C given that $|\vec{AC}| = |\vec{AB}|$



Find vector equation of line

$$\vec{AB} = \begin{pmatrix} 3 \\ -3 \\ 2 \end{pmatrix} - \begin{pmatrix} 0 \\ 2 \\ -4 \end{pmatrix} = \begin{pmatrix} 3 \\ -5 \\ 6 \end{pmatrix}$$

$$r = \begin{pmatrix} 0 \\ 2 \\ -4 \end{pmatrix} + \lambda \begin{pmatrix} 3 \\ -5 \\ 6 \end{pmatrix}$$

when $\lambda = 1$ this defines the point B

Therefore when $\lambda = -1$ this defines the point C

$$\vec{OC} = \begin{pmatrix} 0 \\ 2 \\ -4 \end{pmatrix} + (-1) \begin{pmatrix} 3 \\ -5 \\ 6 \end{pmatrix}$$

$$\vec{OC} = \begin{pmatrix} -3 \\ 7 \\ -10 \end{pmatrix}$$

$$C(-3, 7, -10)$$

Check

Find midpoint of C and B

$$\left(\frac{-3+3}{2}, \frac{7+(-3)}{2}, \frac{-10+2}{2} \right) = (0, 2, -4) \\ = \text{point A}$$