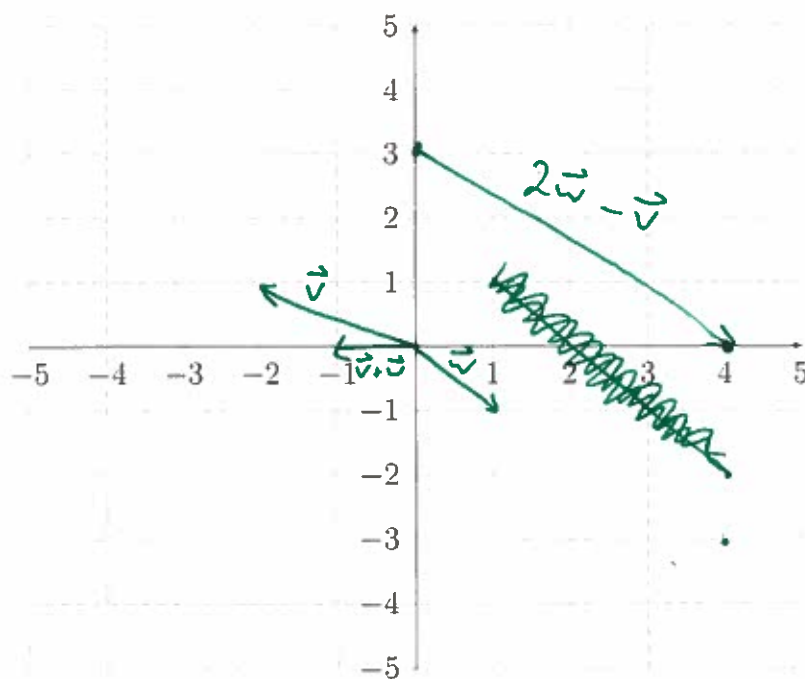


Quick Hit 11

1. Consider the vectors $\vec{v} = -2\vec{i} + \vec{j}$ and $\vec{w} = \vec{i} - \vec{j}$.

(a) Draw and label the vectors \vec{v} , \vec{w} , $\vec{v} + \vec{w}$, and $2\vec{w} - \vec{v}$ on the following axes.

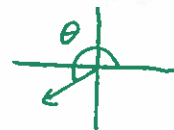


- (b) What is the unit vector decomposition of $2\vec{w} - \vec{v}$?

$$\begin{aligned} 2\vec{w} &= 2\vec{i} - 2\vec{j} \\ -\vec{v} &= 2\vec{i} - \vec{j} \\ 2\vec{w} - \vec{v} &= 4\vec{i} - 3\vec{j} \end{aligned}$$

2. Consider the vector $\vec{u} = -3\vec{i} - 2\vec{j}$. Find the polar form of \vec{u} (i.e. find $\|\vec{u}\|$ and find the angle that \vec{u} makes with the horizontal).

$$\|\vec{u}\| = \sqrt{3^2 + 2^2} = \sqrt{13}$$



$$\sqrt{13} \cos \theta = -3$$

$$\sqrt{13} \sin \theta = -2$$

$$\cos \theta = \frac{-3}{\sqrt{13}}$$

$$\rightarrow \theta = -\arccos\left(\frac{-3}{\sqrt{13}}\right) \text{ since } \theta \text{ is in the third quadrant}$$

