

7. If $\vec{u} = \begin{bmatrix} -2 \\ 1 \end{bmatrix}$, $\vec{v} = \begin{bmatrix} 2 \\ -3 \end{bmatrix}$, and $\vec{w} = \begin{bmatrix} -1 \\ -3 \end{bmatrix}$.

a. Find $3\vec{u} - 2\vec{v} + \vec{w}$.

$$\begin{bmatrix} -6 \\ 3 \end{bmatrix} - \begin{bmatrix} 4 \\ -6 \end{bmatrix} + \begin{bmatrix} -1 \\ -3 \end{bmatrix} = \begin{bmatrix} -11 \\ 6 \end{bmatrix}$$

b. Find a unit vector with the same direction as \vec{w} .

$$\|\vec{w}\| = \sqrt{10}$$

$$\frac{1}{\sqrt{10}} \vec{w} = \begin{bmatrix} -1/\sqrt{10} \\ -3/\sqrt{10} \end{bmatrix} \text{ is a unit vector } \parallel \text{ to } \vec{w}.$$

8. Find all solutions to $x^3 = i$.

$$i = e^{90^\circ i}$$

$$(e^{90^\circ i})^{1/3} \Rightarrow e^{(30^\circ + 0^\circ)i}$$

$$\Rightarrow e^{(30^\circ + 120^\circ)i}$$

$$\Rightarrow e^{(30^\circ + 240^\circ)i}$$

9. By hand, graph $r = 4 \sin(3\theta)$.

θ	3θ	$\sin(3\theta)$	$4 \sin(3\theta)$
$0 \rightarrow \pi/6$	$0 \rightarrow \pi/2$	$0 \rightarrow 1$	$0 \rightarrow 4$
$\pi/6 \rightarrow \pi/3$	$\pi/2 \rightarrow \pi$	$1 \rightarrow 0$	$4 \rightarrow 0$
\vdots	\vdots	\vdots	\vdots

