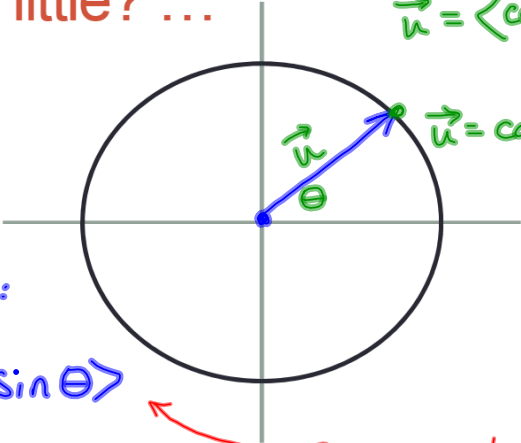


WRITING VECTORS IN TRIG FORM

Aren't you starting to miss the unit circle just a little? ...



If the vector is not a UNIT vector:

$$\vec{v} = \|\vec{v}\| \langle \cos \theta, \sin \theta \rangle$$

OR

$$\vec{v} = \|\vec{v}\| (\cos \theta \vec{i} + \sin \theta \vec{j})$$

component form

sum of unit vectors

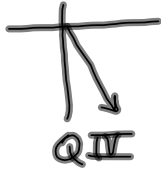
magnitude

direction

Write each vector in trig form.

① mag
② direction
③ vector in trig form

a) $\vec{a} = \langle 2, -6 \rangle$ ① $\|\vec{a}\| = \sqrt{4+36} = \sqrt{40} = 2\sqrt{10}$

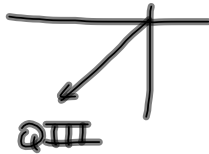


② $\Theta' = \tan^{-1}\left(-\frac{6}{2}\right) = 71.57^\circ$

$\Theta = 288.43^\circ$

③ $\vec{a} = 2\sqrt{10} \langle \cos 288.43^\circ, \sin 288.43^\circ \rangle$

b) $\vec{b} = -\vec{i} - 4\vec{j}$ $\|\vec{b}\| = \sqrt{1+16} = \sqrt{17}$



$\Theta' = \tan^{-1}\left(-\frac{4}{-1}\right) = 75.96^\circ$

$\Theta = 255.96^\circ$

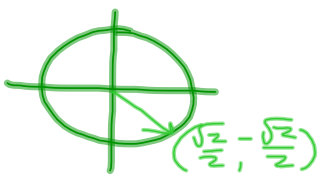
$\vec{b} = \sqrt{17} (\cos 255.96^\circ \vec{i} + \sin 255.96^\circ \vec{j})$

Find the component form of each vector.

a) $\vec{v} = 6 \langle \cos 120^\circ, \sin 120^\circ \rangle$ $\vec{v} = 6 \langle -\frac{1}{2}, \frac{\sqrt{3}}{2} \rangle$
 ↑ magnitude ↑ direction ↑
 $= \langle -\frac{6}{2}, \frac{6\sqrt{3}}{2} \rangle$
 $= \langle -3, 3\sqrt{3} \rangle$



b) $\vec{w} = 11(\cos 315^\circ \vec{i} + \sin 315^\circ \vec{j})$



$\vec{w} = 11 \langle \frac{\sqrt{2}}{2}, -\frac{\sqrt{2}}{2} \rangle$

$= \langle \frac{11\sqrt{2}}{2}, -\frac{11\sqrt{2}}{2} \rangle$


Write your answer in **component form**.
Round to the nearest 100th.

$$\bullet 4(\cos 32^\circ \vec{i} + \sin 32^\circ \vec{j}) - 3(\cos 173^\circ \vec{i} + \sin 173^\circ \vec{j})$$

$$\begin{aligned}
 &= 4\langle \cos 32^\circ, \sin 32^\circ \rangle - 3\langle \cos 173^\circ, \sin 173^\circ \rangle \\
 &= \langle 4\cos 32^\circ, 4\sin 32^\circ \rangle - \langle 3\cos 173^\circ, 3\sin 173^\circ \rangle \\
 &= \langle 4\cos 32^\circ - 3\cos 173^\circ, 4\sin 32^\circ - 3\sin 173^\circ \rangle \\
 &= \langle 6.37, 1.75 \rangle
 \end{aligned}$$

Find vector \vec{v} with the given magnitude and the same direction as vector \vec{u} .

a) $\|\vec{v}\| = 12$ $\vec{u} = \langle -2, 5 \rangle$



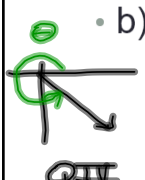
$$\theta' = \tan^{-1}\left(\frac{5}{-2}\right) = 68.2^\circ$$

$$\theta = 111.8^\circ$$

trig form: $12\langle \cos 111.8^\circ, \sin 111.8^\circ \rangle$

same form: $\langle -4.46, 11.14 \rangle$

b) $\|\vec{v}\| = 12$ $\vec{u} = 4\vec{i} - \vec{j}$



$$\theta' = \tan^{-1}\left(\frac{-1}{4}\right) = 14.04^\circ$$

$$\theta = 345.96^\circ$$

trig form: $12(\cos 345.96^\circ \vec{i} + \sin 345.96^\circ \vec{j})$

same form: $11.64\vec{i} - 2.91\vec{j}$