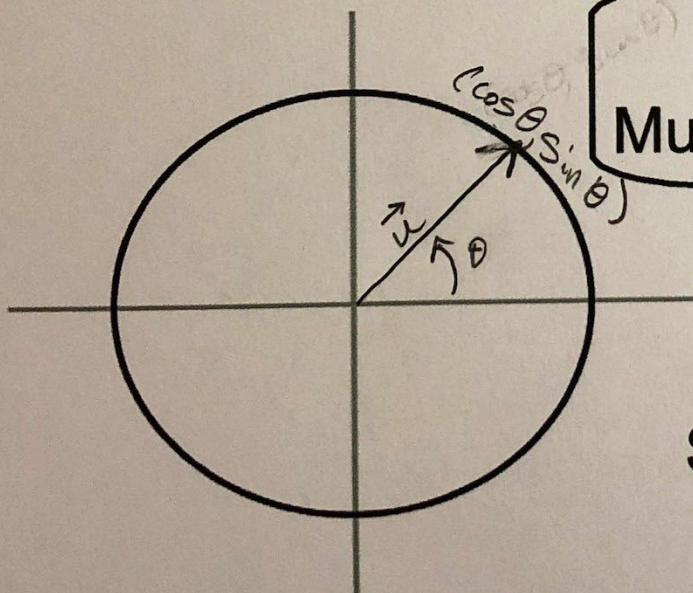


WRITING VECTORS IN TRIG FORM



Not a unit vector?
Multiply by the magnitude!

Component Form:

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

Sum of Vectors Form:

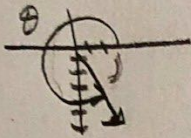
$$\vec{v} = \|\vec{v}\| (\cos \theta i + \sin \theta j)$$

Component form
 $\langle \cos \theta, \sin \theta \rangle$

Sum of vectors form
 $\cos \theta i + \sin \theta j$

Write each vector in trig form.

• a) $\vec{a} = \langle 2, -6 \rangle$



$$\|\vec{a}\| = \sqrt{4 + 36}$$

$$= \sqrt{40}$$

$$= 2\sqrt{10}$$

$$\theta = \tan^{-1}\left(\frac{-6}{2}\right)$$

$$\theta = \tan^{-1}(-3)$$

$$\theta = -71.57$$

$$360 - 71.57$$

$$= 288.43$$

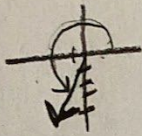
$$2\sqrt{10} \langle \cos 288.43^\circ, \sin 288.43^\circ \rangle$$

• b) $\vec{b} = -\vec{i} - 4\vec{j}$

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

$$\|\vec{b}\| = \sqrt{1 + 16}$$

$$= \sqrt{17}$$



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

$$\theta = \tan^{-1}(4)$$

$$\theta = 75.96^\circ$$

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

$$180 + 75.96 = 255.96^\circ$$

Find the component form of each vector.

• a) $\vec{v} = 6 \langle \cos 120^\circ, \sin 120^\circ \rangle$

$$6 \left\langle -\frac{1}{2}, \frac{\sqrt{3}}{2} \right\rangle = \langle -3, 3\sqrt{3} \rangle$$

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

$$11 \left(\frac{\sqrt{2}}{2} \vec{i} + -\frac{\sqrt{2}}{2} \vec{j} \right)$$

$$\frac{11\sqrt{2}}{2} \vec{i} - \frac{11\sqrt{2}}{2} \vec{j}$$

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

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

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

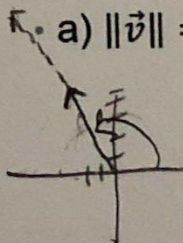
$$\underline{4 \cos 32^\circ \mathbf{i} + 4 \sin 32^\circ \mathbf{j}} - \underline{3 \cos 173^\circ \mathbf{i} - 3 \sin 173^\circ \mathbf{j}}$$

$$6.37 \mathbf{i} + 1.75 \mathbf{j}$$

$$\boxed{\langle 6.37, 1.75 \rangle}$$

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

a) $\|\vec{v}\| = 12$ $\vec{u} = \begin{pmatrix} -2 \\ 5 \end{pmatrix}$
 $\theta = \tan^{-1}\left(\frac{5}{-2}\right)$
 $\theta = -68.2$
 $180 - 68.2 = 111.8^\circ$



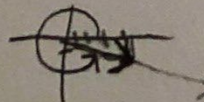
$$\|\vec{v}\| \langle \cos \theta, \sin \theta \rangle$$

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

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

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

$\theta = \tan^{-1}\left(\frac{-1}{4}\right)$
 $\theta = -14.04$
 $360 - 14.04$
 345.96°



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

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

same form: $11.64 \mathbf{i} - 2.91 \mathbf{j}$
 ↳ sum of vectors form