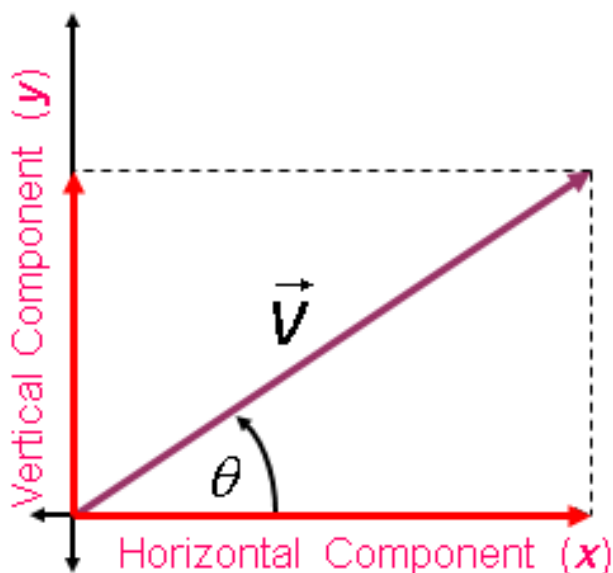


Honors PreCalculus

Direction Angles and
Finding Components of Vectors

Direction Angle:

The angle that a vector makes with the positive x-axis



Finding the components of a vector
a.k.a: "Resolving a vector into its components"

If given $\|v\|$ and θ
 $\vec{v} = \langle \|v\| \cos \theta, \|v\| \sin \theta \rangle$

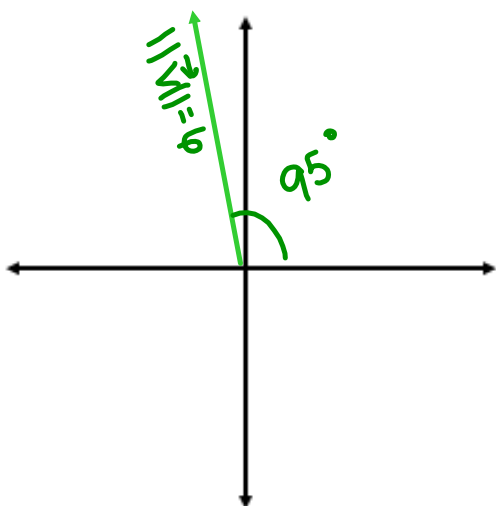
So: If you are given (or can find) the direction angle and the magnitude of a vector, the component form of the vector is:

Resolving a vector into its components

Example 1:

Find the components of the vector with:

- Direction angle of 95°
 - Magnitude of 6
-



$$\vec{v} = \langle x, y \rangle$$

$$\vec{v} = \langle 6 \cos 95^\circ, 6 \sin 95^\circ \rangle$$

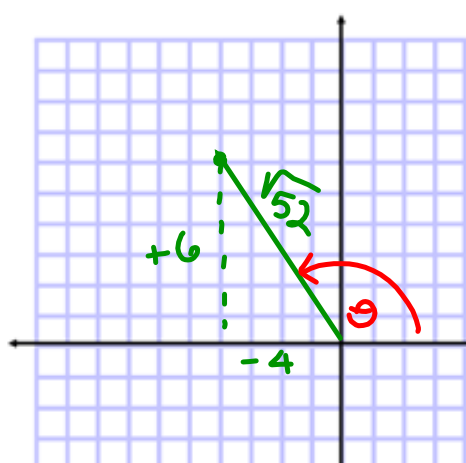
$$\vec{v} = \langle -0.523, 5.977 \rangle$$

Example 2:

Find the direction angle of the vector:

$$\vec{v} = \langle -4, 6 \rangle$$

Sketch the vector so that you know what quadrant it's in!!!!!!



$$|\vec{v}| =$$

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

$$\begin{aligned} \|\vec{v}\| &= \sqrt{(-4)^2 + (6)^2} \\ &= \sqrt{16 + 36} = \sqrt{52} \end{aligned}$$

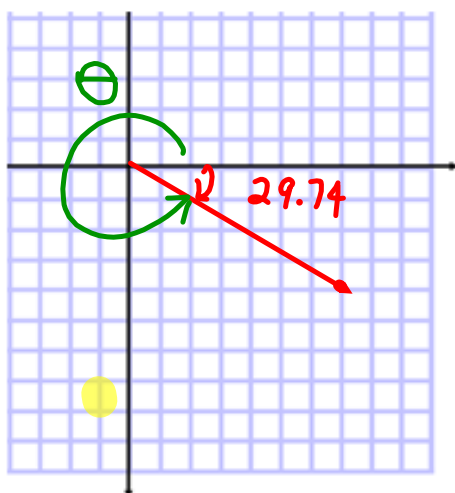
$$\theta = \cos^{-1} \left(\frac{-4}{\sqrt{52}} \right) = 123.69^\circ$$

Example 3:

Find the direction angle of the vector:

$$\vec{v} = \langle 7, -4 \rangle$$

Sketch the vector so that you know what quadrant it's in!!!!!!



$$|\vec{v}| = \sqrt{7^2 + (-4)^2}$$

$$= \sqrt{49 + 16} = \sqrt{65}$$

$$\theta = \cos^{-1}\left(\frac{7}{\sqrt{65}}\right) = 29.74$$

$$\text{direction } \angle = 360 - 29.74$$

$$= 330.26^\circ$$