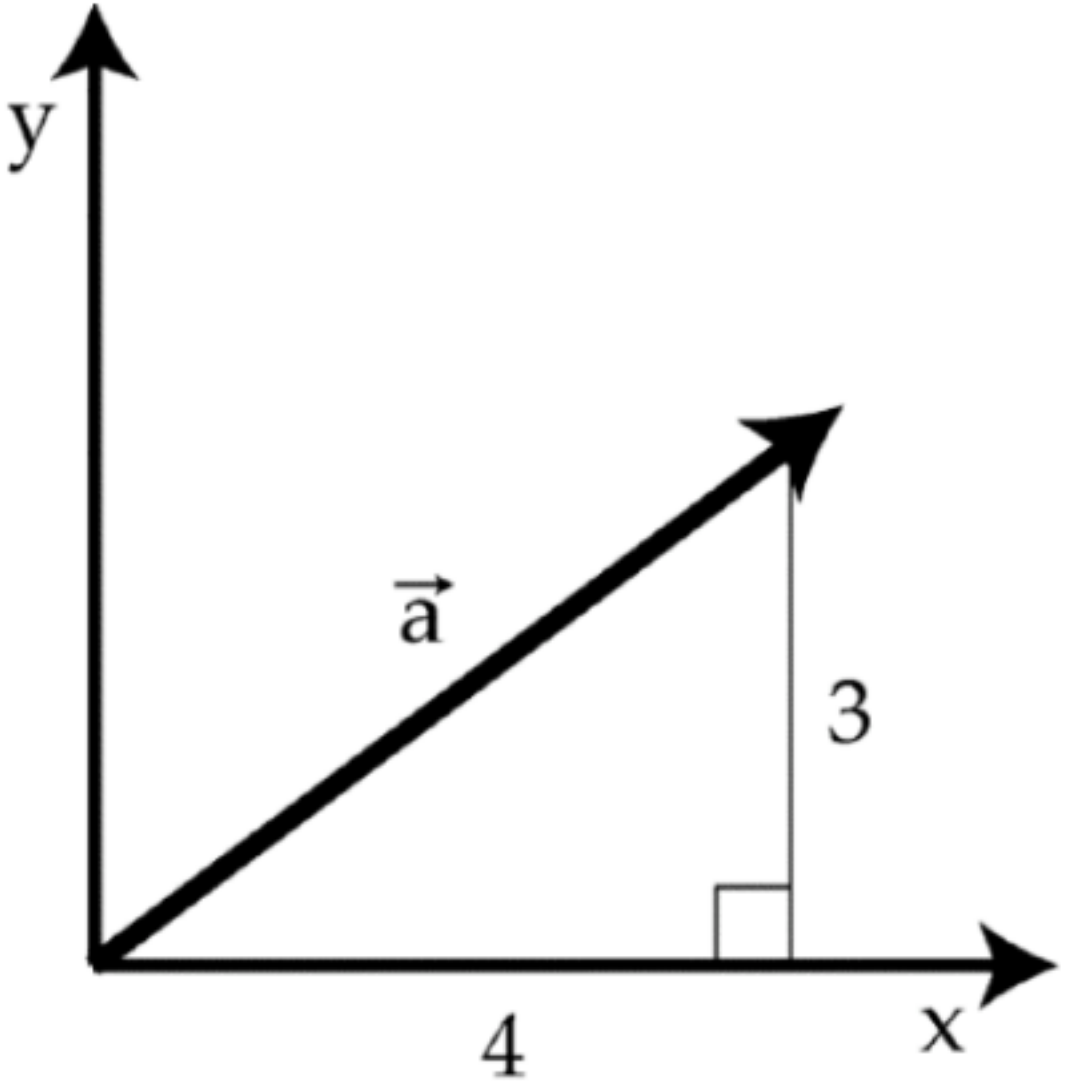
magnitudes and direction

example

length


y
$\vec{a}$
3
4
x

magnitudes and direction

example

What is the magnitude of $\vec{a} = [4,3]$?

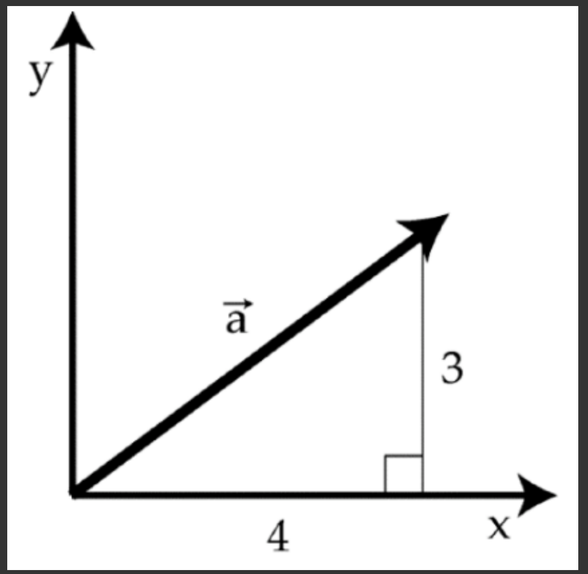
The "magnitude" of a vector is the distance from the endpoint of the vector to the origin, i.e. its length

This vector extends 4 units along the x-axis, and 3 units along the y-axis.

Magnitude $||\vec{a}||$ is compared using Pythagorean Theorem ($x^2 + y^2 = z^2$):

$$||\vec{a}|| = \sqrt{x^2 + y^2} = \sqrt{4^2 + 3^2} = 5$$

The magnitude of a vector is a scalar value.



magnitudes and direction

A unit vector is a vector of magnitude 1 and is obtained by diving a vector by its length (normalizing)
Unit vectors can be used to express the direction of a vector independent of its magnitude.