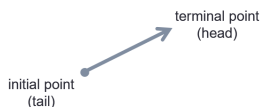


# Intro to Vectors and Vector Operations

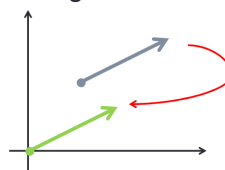
## What is a vector?

- A vector,  $\vec{v}$  or  $\mathbf{v}$  is a directed line segment that has both magnitude (size/length) and direction (angle).



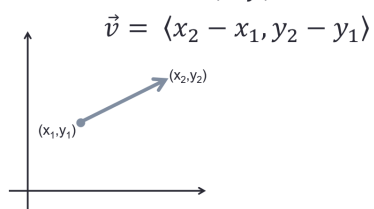
## a Vector in Standard Position ...

- has its initial point (tail) at the origin. (same magnitude and direction)



## Component Form of a Vector ...

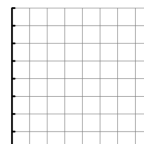
- in standard form:  $\vec{v} = \langle x, y \rangle$



## Example 1 ... initial point: (-3, -4) terminal point: (5, -1)

- a) Find component form.

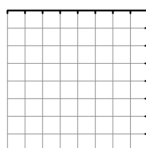
- b) Sketch in standard position.



## Example 2 ... initial point: (3, 5) terminal point: (-1, -1)

- a) Find component form.

- b) Sketch in standard position.



## Vector Operations

- Given  $\vec{u} = \langle 2, -9 \rangle$  and  $\vec{v} = \langle -6, 8 \rangle$ .

- Find:

a)  $\vec{u} + \vec{v}$

b)  $\vec{v} - \vec{u}$

c)  $-2\vec{u} - 3\vec{v}$

d)  $\vec{u} + \frac{1}{2}\vec{v}$