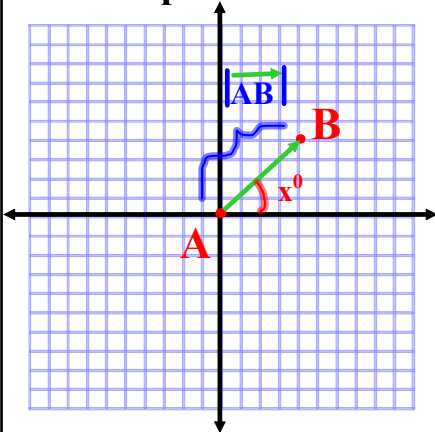


Sec. 8.7 - Vectors

Vector: - is a quantity that has both magnitude & direction

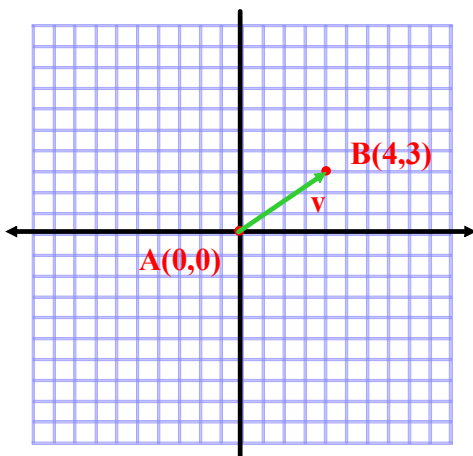
- **magnitude**: the length of the vector from its initial point to its terminal point

- **direction** - is the angle that is formed with the positive x-axis or any other horizontal line



magnitude of $\vec{AB} = |\vec{AB}|$

direction of $\vec{AB} = x^0$



Name: \vec{AB} or \vec{v}

Initial Point : A

Terminal point: B

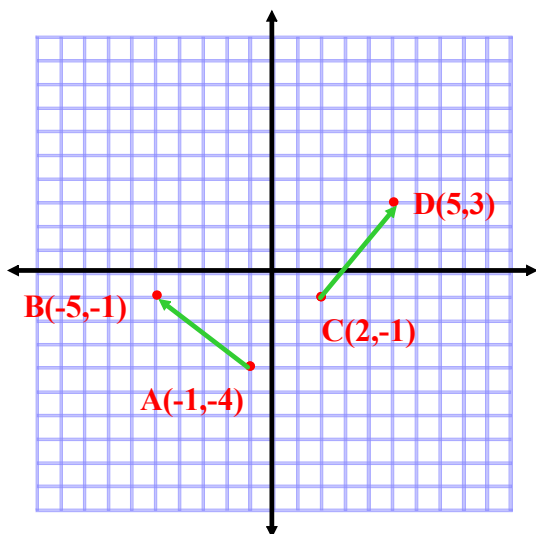
- **standard position** - when a vector has its initial point at the origin

- **component form** - is when a vector is described in terms of its horizontal change x & its vertical change y from its initial point to its terminal point

$$\vec{AB} = \vec{v} = (4,3)$$

Writing Vectors in Component Form:

- 1) Subtract : terminal x - initial x
- 2) Subtract: terminal y - initial y
- 3) Write as an ordered pair

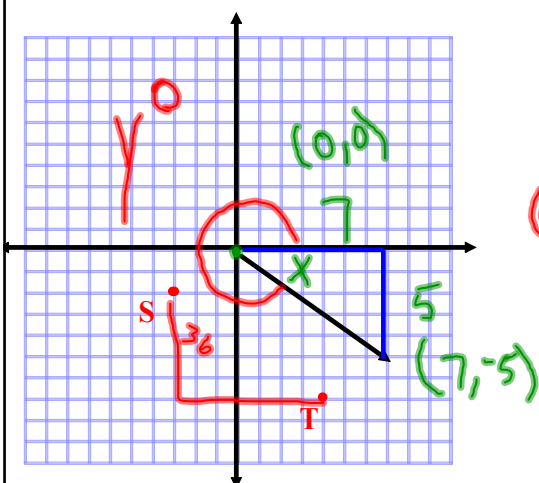


Find the magnitude & direction of ST for S(-3, -2) & T(4, -7)

1) Use distance formula to find magnitude.

2) Use trig. to find direction.

- a) reposition so initial pt. at origin
- b) draw rt. triangle with ST as the hyp.
- c) find needed angle



(a) $\uparrow 2, \rightarrow 3$

$$\tan x = \frac{5}{7} \quad \tan^{-1}$$

$$\tan x = 0.714$$

$$x = 36^\circ$$

$$360 - x = y \rightarrow$$

$$y = 360 - 36$$

$$y = 324^\circ$$

★ **Equal Vectors**: 2 vectors are equal if & only if they have the same magnitude & direction

Parallel Vectors: 2 vectors are parallel if & only if they have the same or opposite direction

★ **Opposite Vectors**: 2 vectors are opposites if they have the same magnitude & opposite directions

Key Concept

Equal, Opposite, and Parallel Vectors

For Your
Reference

Equal Vectors Two vectors are equal if and only if they have the same magnitude and direction.

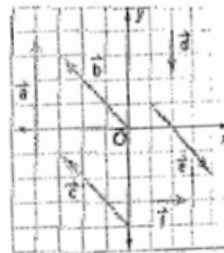
Example $\vec{b} = \vec{c}$ **Nonexample** $\vec{b} \neq \vec{e}$

Parallel Vectors Two vectors are parallel if and only if they have the same or opposite direction.

Example $\vec{d} \parallel \vec{a}$ **Nonexample** $\vec{d} \not\parallel \vec{f}$

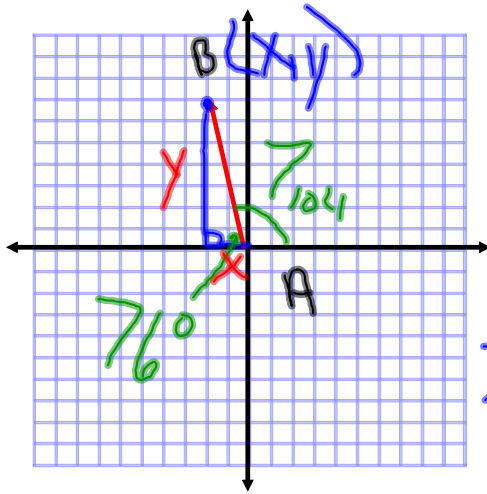
Opposite Vectors Two vectors are opposites if they have the same magnitude and opposite directions.

Example \vec{b} and \vec{e} **Nonexample** \vec{d} and \vec{f}



Write the following vector in component form:

magnitude = 7, direction = 104°



$$\vec{AB} = (-1.7, 6.8)$$

$$\begin{aligned} \cos 76^\circ &= \frac{x}{7} \\ 7(.242) &= \frac{x}{7} \cdot 7 \\ 1.7 &= x \end{aligned}$$

$$\begin{aligned} \sin 76^\circ &= \frac{y}{7} \\ (0.97)^2 &= \frac{y^2}{7} \\ 6.8 &= y \end{aligned}$$

Homework:

p.597, # 8-12 even, 14, 15, 16,
28, 32, 35, 36, 48-50 all,
55-60 all