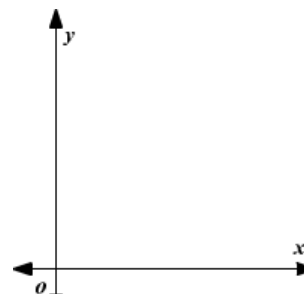


EQ:

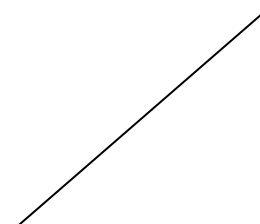
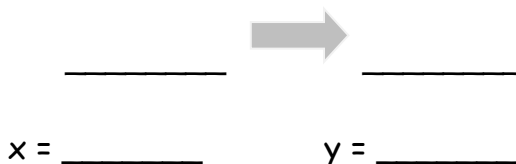
PART II: Algebraic Vectors

Terms & Symbols to Know:

- Vectors in the Plane
- x-component and y-component
- Angle of a Vector --- the angle \_\_\_\_\_ and the \_\_\_\_\_ line.



RECALL: Polar to Rectangular



The radius in the polar plane would equal the \_\_\_\_\_ of a vector.

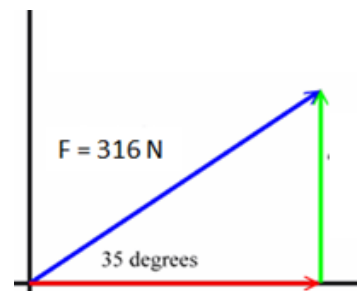
- Magnitude of a Vector --- \_\_\_\_\_ of vector

Notation: \_\_\_\_\_

Horizontal Component =

Vertical Component =

Ex. Find the horizontal and vertical components of the given vector.



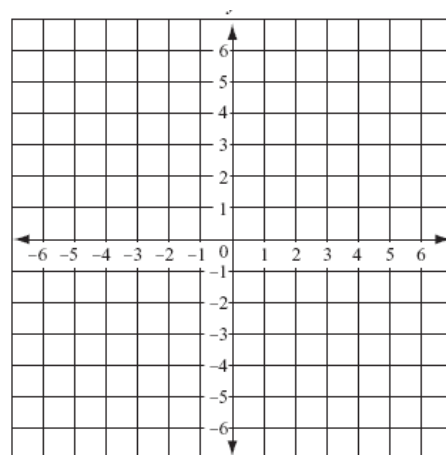
RECALL: How do you calculate the distance between two stationary points?

Ex. Find the magnitude of the vector  $\overrightarrow{PQ}$  whose initial point  $P$  is at  $(1, 1)$  and terminal point is at  $Q$  is at  $(5, 3)$ .

- Component form of a vector --- \_\_\_\_\_ = \_\_\_\_\_      \_\_\_\_\_ = \_\_\_\_\_

Ex Graph the following vectors.

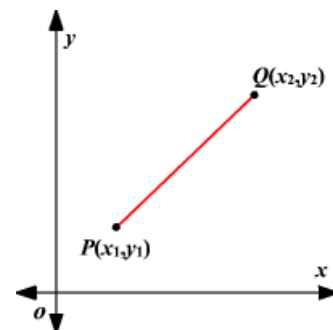
1.  $\mathbf{A} = 6\mathbf{i} - 3\mathbf{j}$
2.  $\mathbf{B} = 3\mathbf{i} + 4\mathbf{j}$
3.  $\vec{w} = \langle -2, 5 \rangle$



- Position Vector ---vector whose \_\_\_\_\_ point is at the \_\_\_\_\_

- Calculating a Position Vector:

$$\vec{v} = \langle \text{_____}, \text{_____} \rangle$$



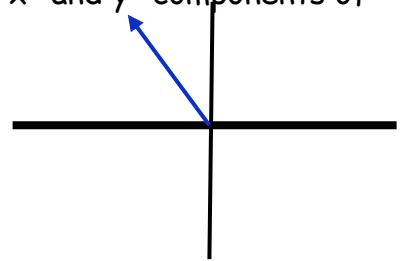
Ex. Given vector  $\vec{w}$  whose initial point is  $P_1 = (-1, 2)$  and terminal point  $P_2 = (4, 6)$ , find the position vector  $\vec{v}$ .

- Unit Vector --- a vector of length \_\_\_\_\_
- Components of a Unit Vector --- \_\_\_\_\_ = \_\_\_\_\_

Ex. Find a unit vector in the direction of  $\mathbf{v} = -2\mathbf{i} + 5\mathbf{j}$ . Verify that this vector has length 1.

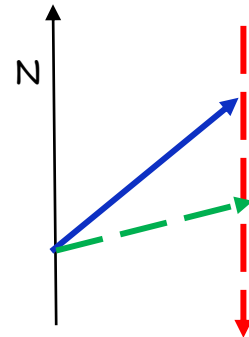
In Class Practice:

1. If  $OC$  has a magnitude of 5 and a direction angle of  $125^\circ$ , find the x- and y- components of  $OC$  to the nearest whole number.



2. Find the magnitude of  $\vec{w} = \langle 3, -2 \rangle$ .

3. An airplane with an air speed of 200 mi/h is flying on a heading of  $58^\circ$ . The wind is blowing from due north at 26 mi/h. What is the ground speed of the plane and the actual heading of its course?



4. Given vectors  $\vec{v} = 2\mathbf{i} + 7\mathbf{j}$  and  $\vec{w} = 5\mathbf{i} - 4\mathbf{j}$

- a) write the vectors in component form.
- b) find  $3\vec{v}$ .
- c) find  $2\vec{v} - 3\vec{w}$
- d) find  $\|\vec{v}\|$ .
- e) find the unit vector,  $\vec{u}$ , in the same direction as  $\vec{v}$ .

➤ **Assignment:** Practice Worksheet #2 Algebraic Vectors