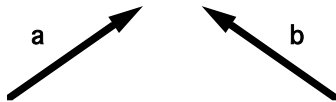


***INTERACTIVE LECTURE DEMONSTRATION***  
**PREDICTION SHEET — INTRODUCTION TO VECTORS**

**Directions:** This sheet will be collected. Write your name at the top to record your presence in this class. Follow your instructor's directions. You may write whatever you wish on the sheet labeled Results Sheet, and take it with you.

**Demonstration 1:** Sketch the vector for a position 10 m southwest of the origin.

**Demonstration 2:** Vector Addition.



Given the two vectors **a** and **b** above,

Sketch to the right your prediction

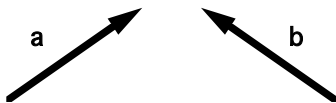
for their sum  $\mathbf{c} = \mathbf{a} + \mathbf{b}$ .

Be certain to label any vectors you show.

**Demonstration 3:** Show an example of two non-zero vectors that add up to zero.

**Demonstration 4:** Show an example of  $\mathbf{a} + \mathbf{b} + \mathbf{c} = 0$ . (Three vectors whose sum will be zero)

**Demonstration 5:** Vector Subtraction



Given the two vectors **a** and **b** above,

Sketch to the right your prediction

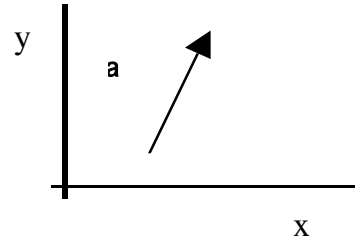
for their difference  $\mathbf{c} = \mathbf{a} - \mathbf{b}$ .

Be certain to label the vectors.

**Demonstration 6:** Components of a vector are the projection of the vector in the direction of the coordinate axis.

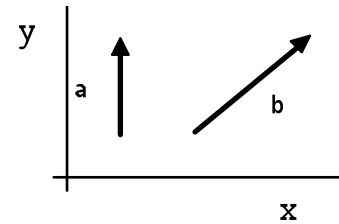
Components of a given vector are also vectors along the  $x$ - and  $y$ - axes whose resultant is the given vector.

Draw the  $x$  and  $y$  components of vector **a**.



**Demonstration 7:** Vector **a** with the  $x,y$  axes shown has only a  $y$  component. The  $x$  component is zero.

Draw another set of axes  $x',y'$  over the diagram such that **b** has only an  $x'$  component.



Can you always find a coordinate system such that a single given vector in two dimensions  $(x,y)$  has no  $x$  component?    **YES**   **NO**   (circle one)

**Demonstration 8:** Components of a vector are the projection of the vector in the direction of the coordinate axis. Draw the  $x$  and  $y$  components of vectors **a** and **b** on the  $x$  and  $y$  axis. Draw the vector sum of all four components.

