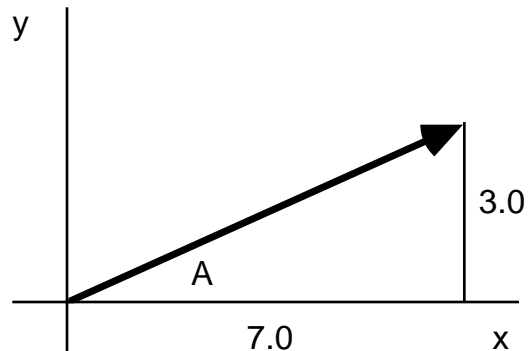


Vectors : Notes/W.S.-15

There are two ways to represent vectors. One way is the ordered pair method. The vector $[7.0, 3.0]$ has an x-component of 7.0, and a y-component of 3.0. It is shown below on an x-y grid. In some situations, the +x direction is East and the +y direction is North.



The **magnitude** of this vector equals

$$\sqrt{7.0^2 + 3.0^2}$$

which equals 7.6 units. This is the length of the vector. The angle A can be found by taking the arc tangent of $3.0/7.0$. So;

$$A = \text{Tan}^{-1} \frac{3.0}{7.0}$$

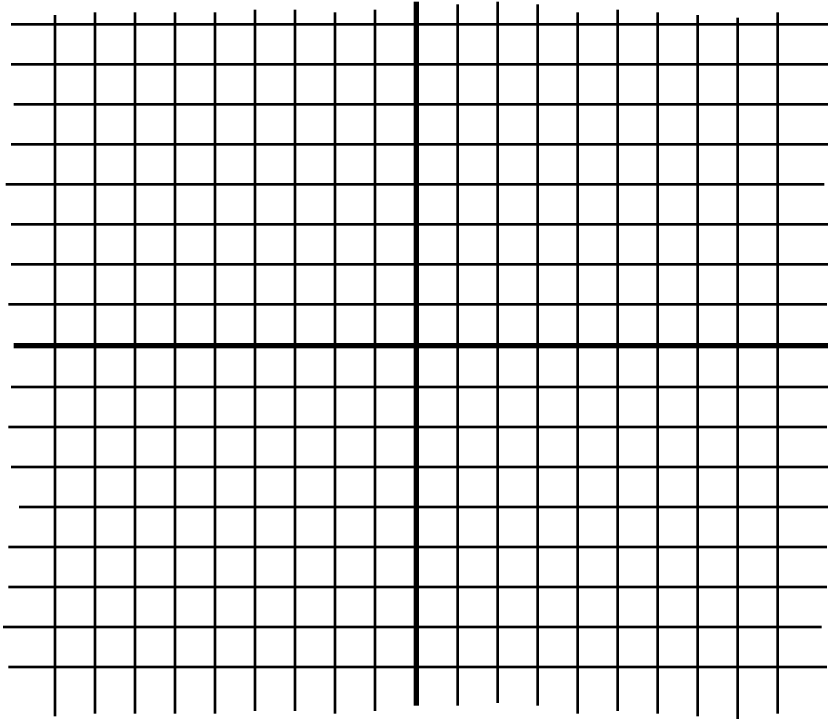
and the angle $A = 23^\circ$. The second way to represent the vector is:

$$7.6 \text{ units } [23^\circ \text{ North of East }]$$

Problems:

1) Draw a picture of the following vectors on an x-y grid.

- a) $[4.0, 2.0]$, b) $[-3.0, 5.0]$, c) $[8.0, -2.0]$, d) $[-1.0, -6.0]$



2) Give the magnitude of each of the vectors in question #1.

- a) b) c) d)

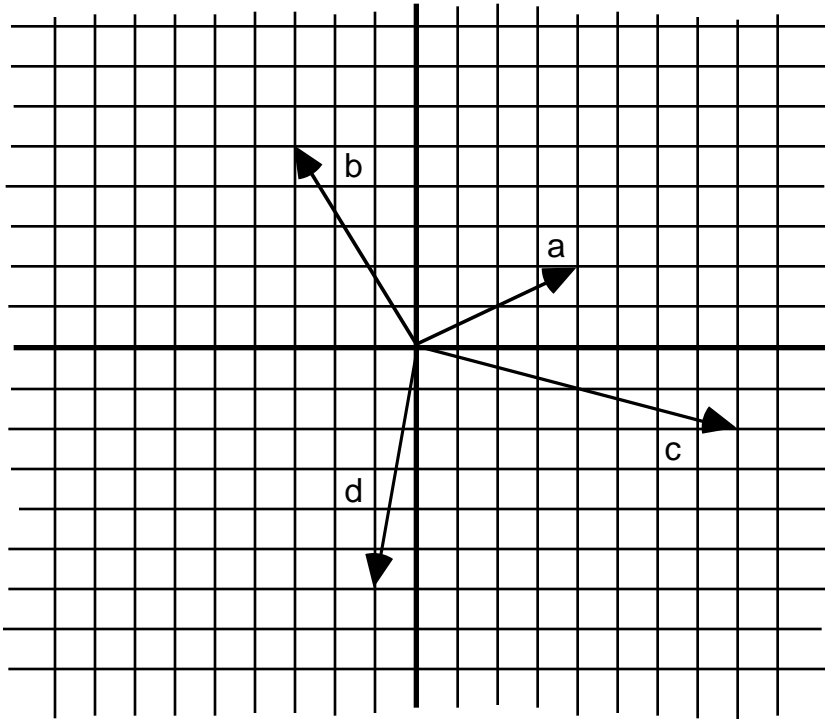
3) Give the angle (in degrees) between the vectors in question #1 and the x-axis.

- a) b) c) d)

4) Rewrite the vectors in question #1 as a magnitude and a direction. Assume that the +x-direction is East and the +y-direction is North.

- a) b) c) d)

Answers: 1)



- 2)a) 4.5, b) 5.8, c) 8.2, d) 6.1, 3)a) 27, b) 59, c) 14, d) 81,
 4)a) 4.5 [27°N of E], b) 5.8 [59°N of W], c) 8.2 [14°S of E],
 d) 6.1 [81°S of W].