

CLASS EXERCISE # 1 - 13 June 2005

1. (2 points) Determine the x and y components of a vector of magnitude 4.7 m in a direction 35° west of north. Be sure to include the correct signs!

The angle of this vector is $\theta = 90^\circ + 35^\circ = 125^\circ$

The x component is

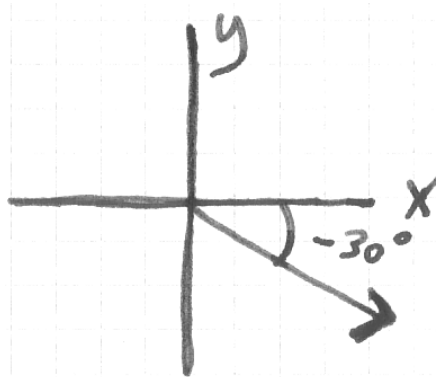
$$A \cos \theta = (4.7 \text{ m})(\cos 125^\circ) = (4.7 \text{ m})(-0.574) = -2.70 \text{ m}$$

The y component is

$$A \sin \theta = (4.7 \text{ m})(\sin 125^\circ) = (4.7 \text{ m})(0.819) = +3.85 \text{ m}$$

2. A vector in the fourth quadrant has an x component of 10.0 m and an angle $\theta = -30^\circ$.

(a) (1 point) Make a sketch of this vector.



(b) (3 points) Determine the magnitude of this vector and its y component.

Call this vector \vec{A} . Its x component is $A \cos \theta = 10.0 \text{ m}$ so

$$A = (10.0 \text{ m}) / (\cos (-30^\circ)) = (10.0 \text{ m}) / (0.866) = 11.55 \text{ m}.$$

Its y component is then

$$A \sin \theta = (11.55 \text{ m})(\sin (-30^\circ)) = (11.55 \text{ m})(-0.50) = -5.77 \text{ m}.$$

As a check, let's verify that the sum of the squares of the two components equals the square of the magnitude; it does:

$$(10.0 \text{ m})^2 + (-5.77 \text{ m})^2 = 133.3 \text{ m}^2 = (11.55 \text{ m})^2$$