3-Series Problem

3.1) Characterize the vector shown to the right in *unit vector notation*.

$\theta = \measuredangle 240°$

$\left|\vec{A}\right| = (5.50 \text{ m})$
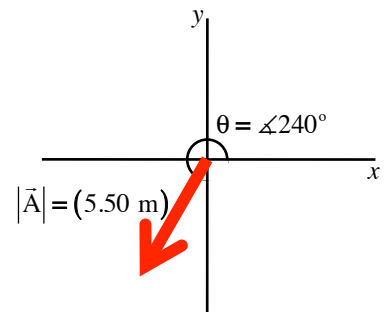
3.3.) The lower-left corner of a window pane is designated "the origin" of a coordinate system. A speck of dust is located at (2.00 m, 1.00 m) as shown in the sketch:
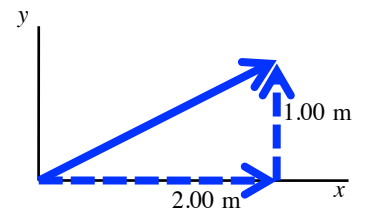
    a.) How far is the speck from the origin?
    b.) Characterize the speck's position vector in *polar notation*.
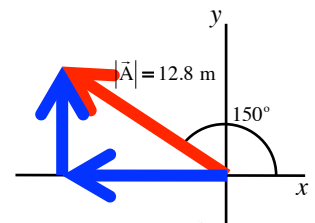
1.00 m

2.00 m

3.13) A hawk moves 200 feet flying parallel to the ground, then angles upward at $30°$ traveling 135 feet until it angles downward at an angle $40°$ traveling another 135 feet. Use *graphical vector analysis* to determine its net displacement. (All angles are measured relative to the horizontal.)

3.15) The vector shown to the right has *x* and *y-components* of -25 and 40 meters. Characterize the vector in polar notation.
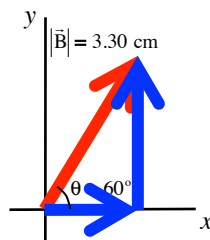
40

25
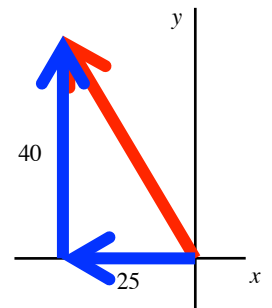
3.19) Characterize the three vectors shown below in *unit vector notation*.

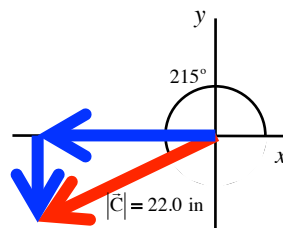a.) $(12.8\text{m})\measuredangle 150°$

b.) $(3.30\text{cm})\measuredangle 60°$

c.) $(22.0 \text{ in})\measuredangle 215°$

$\left|\vec{A}\right| = 12.8$ m

150°

$\left|\vec{B}\right| = 3.30$ cm

θ 60°

215°

$\left|\vec{C}\right| = 22.0$ in

3.23) For the two vectors: $\vec{A} = 3.00\hat{i} - 2.00\hat{j}$ and $\vec{B} = -1.00\hat{i} - 4.00\hat{j}$, determine:

    a.) $\vec{A} + \vec{B}$

    b.) $\vec{A} - \vec{B}$

    c.) $\left| \vec{A} + \vec{B} \right|$

    d.) $\left| \vec{A} - \vec{B} \right|$

    e.) the direction of $\vec{A} + \vec{B}$ and $\vec{A} - \vec{B}$.

3.41) An ultra-light glider with a small motor on it moves at 41.0 km/hr at an angle of 60 degrees north of west:

    a.) Characterize its velocity in *unit vector notation*, assuming the *x-axis* is to the east.

    b.) It turns due north after 3.00 hours whereupon its speed drops to 25.0 km/hr. Characterize its new velocity in *unit vector notation*.

    c.) Determine its displacement after the first three hours. Characterize it in *unit vector notation*.

    d.) It flies for another 1.50 hours. Characterize its displacement during that last 1.50 hours in *unit vector notation*.

    e.) What is the ultra-light's *net displacement* over its full flight?