Chapter 3 Problem II (+1) Name _____

1. Which of the following quantities are scalars, and which are vectors?
   a) The acceleration of a plane as it takes off
   b) The number of passengers on the plane
   c) The duration of the flight
   d) The displacement of the flight
   e) The amount of fuel required for the flight

2. A roller coaster moves 85 m horizontally, then travels 45 m at an angle of 30.0° above the horizontal. What is its displacement from its starting point? Use graphical techniques.

3. A novice pilot sets a plane's controls, thinking the plane will fly at 250 km/h to the north. If the wind blows at 75 km/h toward the southeast, what is the plane's resultant velocity? Use graphical technique.

4. While flying over the Grand Canyon, the pilot slows the plane's engines down to one-half the velocity in Question 3 above. If the wind's velocity is still 75 km/h toward the southeast, what will the plane's new resultant velocity be? Use graphical technique.

5. The water used in many fountains is recycled. For instance, a single water particle in a fountain travels through an 85-m system and then returns to the same point. What is the displacement of a water particle during one cycle?

6. An archaeologist climbs the Great Pyramid in Giza, Egypt. If the pyramid's height is 136 m and its width is 2.30×10^2 m, what is the magnitude and the direction of the archaeologist's displacement while climbing from the bottom of the pyramid to the top?

7. While following the directions on a treasure map, a pirate walks 45.0 m north, then turns and walks 7.5 m east. What single straight-line displacement could the pirate have taken to reach the treasure?

8. Emily passes a soccer ball 6.0-m directly across the field to Kara, who then kicks the ball 14.5-m directly down the field to Luisa. What is the ball's total displacement as it travels between Emily and Luisa?

9. A humming bird flies 1.2 m along a straight path at a height of 3.4 m above the ground. Upon spotting a flower below, the humming bird drops directly downward 1.4 m to hover in front of the flower. What is the hummingbird's total displacement?