Vectors in Two Dimensions and Relativity Worksheet (Extra Practice)

1. Can the total distance moved ever exceed the magnitude of an object's displacement from its original position?

2. To get to the cafeteria entrance, a teacher walks 34 m [N] in one hallway, and then 46 m [W] in another hallway. The entire motion takes 1.5 minutes. Determine the teacher's
    a. resultant displacement (use a scale diagram first and verify with trig)
    b. average speed
    c. average velocity

3. From the reference frame of a stationary observer, a car, travelling at a constant speed of 92 km/h, is passed by a truck moving at 105 km/h.
    a. From the point of view of the car, what is the truck's speed?
    b. From the point of view of the truck, what is the car's speed?

4. A blimp is travelling at a velocity of 15 km/h [W] relative to the air. A wind is blowing from the south at an average speed of 25 km/h relative to the ground. Determine the velocity of the blimp relative to the ground.

5. An airplane pilot checks the instruments and finds that the velocity of the plane relative to the air is 320 km/h [S] A radio report indicates that the wind velocity relative to the ground is 75 km/h [E]. What is the velocity of the plane relative to the ground as recorded by an air traffic controller in a nearby airport?

6. Would a passenger in a plane be more concerned about a plane's "air speed" (velocity relative to the air) or "ground speed" (velocity relative to the ground)? Explain.