Review Vector Basics and Addition

Directions: Read each question carefully. **Show all work and box the answer with correct units.**

1. What is the difference between a vector and a scalar?

2. Can I add a displacement vector and a velocity vector? Explain why or why not.

3. Which formulas would I use to solve for the horizontal and vertical components?

4. Which formulas would I use to determine magnitude (R) and direction (θ)?

5. What are the horizontal and vertical components of a cat's displacement when it has climbed 5 m directly up a tree?

6. A girl delivering newspapers travels three blocks west, four block north, then six blocks east.
    a. What is her resultant displacement?
    b. What is the total distance she travels?

7. An outdoorsman leaves camp to go for a hike. He first travels 17 km north, then 10 km east, then 7 km south where he falls down and breaks his ankle. A helicopter is sent from the base camp to rescue him. What angle from north and how far should the pilot fly?

8. When the sun's elevation is 29.3° from the horizon, a building casts a shadow that is 38.4 m long. Find the height of the building.

9. A duck is accelerating away from a hunter at 3.2 m/s^2 at an angle of 35° to the ground.

    a. What is the horizontal acceleration?
    b. What is the vertical acceleration?

10. Add together these vectors: Vector 1 = 62 m @40° N of E; Vector 2 = 30 m @ 30° S of E.

11. A novice plane set's 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 (45°), what is the plane's resultant velocity?

12. A person is kayaking in the ocean at 5.6 m/s 75° to the horizon when he experiences a current of 3.8 m/s 45° south of west. What is the speed and direction of his kayak?