Vector Application Practice

1. A plane flies with a velocity of 52 m/s east through a12 m/s cross wind blowing the plane south. Find the magnitude and direction (relative to due east) of the resultant velocity at which it travels.
2. A plane intends to fly north with a speed of 250 m/s relative to the ground through a high altitude cross wind of 50 m/s coming from the east. Determine …
    a. the bearing that the plane should take (relative to due north)
    b. the plane's speed with respect to the air
3. An airplane flies due north at 100 m/s through a 30 m/s cross wind blowing from the east to the west. Determine the resultant velocity of the airplane.
4. A boat heads directly across a river with a velocity of 12 m/s. If the river flows at 6.0 m/s find the magnitude and direction (with respect to the shore) of the boat's resultant velocity.
5. The pilot of a plane points his airplane due South and flies with an airspeed of 120 m/s. Simultaneously, there is a steady wind blowing due West with a constant speed of 40 m/s.
    a. Make a sketch that shows how to find the resultant velocity of the plane. Roughly in what direction is the resultant velocity?
    b. What is the resultant speed of the airplane?
    c. After one hour, how far away is the plane from its starting point?

6. A plane is flying due North at 80 m/s. There is a cross wind of 30 m/s that is blowing due East.
    a. Draw a vector diagram showing how these velocities add. Roughly in what direction is the resultant velocity?
    b. How fast is the plane flying with respect to the ground?
7. A swimmer is able to swim with a speed of 5 m/s in a pool (this is her "water speed".) This same swimmer goes swimming in a river which has a current flowing to the East with a constant speed of 3 m/s. Assume her water speed is always 5 m/s.
    a. What would be her resultant velocity if she tries to swim due East with the current? (Include a vector sketch.)
    b. What would be her resultant velocity if she were to try to swim due West against the current? (Include a vector sketch.)
    c. What would be her resultant velocity if she points herself due North straight across the river? (Include a vector sketch.)

Resources -

http://physics.info/vector-addition/problems.shtml

http://www.themcclungs.net/physics/download/CP/Projectiles/Vector%20Word%20Problems.pdf