

Name \_\_\_\_\_

## Vector Applications

Set up the following word problems and find the missing information. Show all work.

1. Two people are trying to collectively push a box across a room towards the door. Person A pushes with a force of 330 newtons at a  $35^\circ$  from standard position. Person B pushes with a force of 300 newtons at a  $-15^\circ$  from standard position.

a. Who contributes more force towards the door?

b. By how much?

c. What is the total force contributed to push this box?

2. Burt and Ernie meet up to fly a toy helicopter. At full power the airplane can fly 100 km per hour in calm air. Burt has the controls and he makes the helicopter take off heading  $N45^\circ E$ . After he feels comfortable with the controls he turns on full power. A steady wind begins to blow from north to south at a speed of 32 kilometers per hour. In what direction and what speed is the helicopter traveling now?

3. A ship is traveling at a speed of 60 miles per hour with a bearing of  $60^\circ$  on the river with negligible water velocity. When the ship reaches a certain point, it encounters water flow with a velocity of 10 miles per hour in the direction  $S 45^\circ E$ . What are the resultant speed and direction of the ship?

4. A commercial jet is flying from Miami to Seattle. The jet's velocity with respect to the air is 580 miles per hour and its bearing is  $N28^\circ W$ . The wind is blowing from the southwest with a velocity of 60 mph. What is the speed of the jet with respect to the ground? In what direction is the jet flying?

5. A plane is flying  $N20^\circ W$  at a speed of 325 miles per hour. A wind is blowing in the direction of  $N50^\circ W$  at 40 miles per hour. Find the plane's actual speed and direction.

6. Two forces act on an object with magnitudes of 37 pounds and 42 pounds at angles of  $-40^\circ$  and  $91^\circ$ , respectively, with the positive x-axis. Find the direction and magnitude of the resultant of these forces