Algebraic vectors essay

MCV4U0Vector ApplicationsName: _____ Date: _____ 1. A ship sailing on the open sea leaves Port A for Port B at a bearing of N25oW. A wind of 6 km/h on a bearing of N10oE blows the ship off course. If the ship is capable of 35 km/h in still water, find the new speed and direction relative to the shore. 2. A boat is capable of 20 km/h in still water. You wish to cross the river to a point directly across from your present position. At what angle to the bank should you steer the boat if the current is 8 km/h? . A boat is capable of 20 km/h in still water. You wish to cross the river downstream so that the angle the boat's push makes with the bank is 50o. At what angle to the bank should the boat steer if the current is 8 km/h? How long will it take to cross if the river is 1. 7 km wide? 4. A boat is capable of 20 km/h in still water. You wish to cross the river to a point 0. 6 km upstream from your present position. If the current is 8 km/h and the river is 1. 5 km wide, at what angle to the bank should you steer the boat?

How long will it take you to cross? 5. An aircraft is currently on course flying from A to B, a distance of 400 km, on a bearing of S20oE at 350 km/h. A 50 km/h wind blowing S80oE starts to blow the aircraft off-course. At what new bearing should the pilot steer in order to stay on course? What will the new speed be after the course correction? 6. You wish to swim across a river that is 0. 3 km wide to a point directly across from your present position. If you can swim at a constant speed of 4 km/h in still water and the current is 2. km/h, at what angle to the bank should you swim so that you end up directly across on the other side (i. e. your actual path is 90o to the bank)? What is your speed relative to the bank? 7. Three coplanar forces of 10 N, 20 N and x N act on a body and maintain it in a state of equilibrium. The x force acts

along the horizontal and the 10 N force at an angle of 90o. Find the value of x and the direction of the 20 N force. 8. Repeat question 7. if the 10 N force now acts at an angle of 60o to the horizontal. 9.

Two tug boats pull a barge directly against the current of a river. The two tow ropes from the tugs are at an angle of 37o to each other; the forces exerted by the tugs along the ropes are both 4200 N. If the current produces a force of 45 N, what is the force with which the barge is pulled forward? 10. An aircraft heading due north is climbing at an angle of 20o to the ground at a speed of 300 km/h. A 50 km/h wind blowing due east blows the aircraft off course. Find the new angle of ascent if the vertical rate of climb is not affected by the wind. 1. A decoration is suspended by 2 ropes attached to a horizontal ceiling. If the ropes make angles of 60o and 50o to the ceiling, and the decoration has a mass of 12 kg, find the tension in the 2 ropes. 12. Three forces all act on a single body. The forces are: 10 N [30o to horizontal] x N [along horizontal] 20 N [unknown angle to horizontal] If the 3 forces maintain the body in a state of equilibrium, find the value of x and the direction of the 20 N force. 13. Find the resultant of: pic] = 500 N [N 30o E][pic]= 600 N [N 20o W][pic] = 700 N [S 10o W] 14. A 25 kg mass is resting on a frictionless plane inclined at an angle of 15o to the horizontal. What force, at an angle of 30o to the plane, must be applied to maintain the mass in a state of equilibrium? Answers: 1. 40. 1 km/h [N20oW]2. 66o3. 68o, 5. 5 min4. 46o, 6. 25 min 5. S13oE, 372 km/h6. 51o, 3. 1 km/h7. x = 17. 3 N, 210o to the horizontal 8. x = 12. 9 N, 206o to the horizontal9. 7921 N 10. 19. 7(11. 80. 4 N, 62. 6 N 12. 194. 5o, 10. 7 N13. 317 N [N 14oW]14. 73 N