

Make a diagram for each of the following problems, and show all of your work on another sheet of paper.

1. A plane flies at a speed of 250 km/hr North, while being blown by a wind of 75 km/hr West. What will be the plane's resultant speed and direction ?
2. If a pilot wants to reach a destination 300 km to the south, in a time of one and a half hours, and he knows that the wind is blowing East at 50 km/hr, In what direction and at what speed will he have to fly to reach his destination on time ?
3. If two girls kick a soccer ball at the same time, one kicking it south with a force of 75 N, and the other kicking it east with a force of 50 N, what will be the resultant force and direction ?
4. A boat makes its way west at 12 m/s, while the current of the river on which it sits is flowing south at a speed of 5 m/s. What is the resultant magnitude and direction of the boat ? If the river is 1,440 m wide, how long will it take the boat to reach the other side ? How far downstream will the boat be when it makes its landing ?
5. - 7. Break the following vectors down into their perpendicular components.
5. 500 N at 135° 6. 225 km/hr at 300° 7. 55 mi/hr at 37°
8. Sandy pushes a lawnmower with a force of 75 N at an angle of 35° with respect to the horizontal. What force pushes the lawnmower down, what force pushes it across ?
9. Ted hits a baseball with a velocity of 60 m/s at an angle of 30° above the horizontal. What are the vertical and horizontal components of the ball's velocity?
10. A ball rolls down a 25° ramp. If the mass of the ball is 5 kg, find the components of the ball's weight parallel and perpendicular to the ramp.
11. Daring Dave, novice skier, bombs out of control down the double diamond trail at his local ski hill. If Dave's weight is 800 N, and the slope's pitch is 38° , what are the components of Dave's weight, and what will his acceleration be ?

1. 261 km/hr, at 107° 2. 206 km/hr, at 256° 3. 90 N at 304° 4. 13 m/s at 203° , 120 s, 600m
5. 354 N north and 354 N west 6. 113 km/hr East and 195 km/hr South 7. 33 mi/hr North and 44 mi/hr East
8. 43 N down and 61 N across 9. 30 m/s vertically and 52 m/s horizontally 10. $F_{\parallel} = 21$ N, $F_{\perp} = 45$ N
11. $F_{\text{par}} = 493$ N, $F_{\text{perp.}} = 630$ N, $a = 6.2$ m/s/s