

Precalculus :
Assignment 10 – Applications

Name _____
Per _____ Date _____

Draw vector diagrams to help solve each problem. Use any appropriate algebraic/trigonometric method to solve.

- 1) Two boys push on a box. One pushes with a force of 125 N to the east. The other exerts a force of 165 N to the north. What is the size and direction of the resultant force on the box?

- 2) An explorer walks 13 km due east, then 18 km north, and finally 3 km west.
 - a) What is the total distance walked?
 - b) What is the resulting displacement of the explorer from the starting point?

- 3) A motorboat heads due east at 16 m/s across a river that flows due north at 9.0 m/s.
 - a) What is the resultant velocity (speed and direction) of the boat?
 - b) If the river is 136 m wide, how long does it take the motorboat to reach the other side?
 - c) How far downstream is the boat when it reaches the other side of the river?

- 4) While flying due east at 120 km/h, an airplane is also carried northward at 45 km/h by the wind blowing due north. What is the plane's resultant velocity?

- 5) Three teenagers push a heavy crate across the floor. Dion pushes with a force of 185 N at 0° . Shirley exerts a force of 165 N at 30° , while Joan pushes with 195 N force at 300° . What is the resultant force on the crate?

- 7) A 42-km/h wind blows toward 215° , while a plane heads toward 125° at 152 km/h. What is the resultant velocity of the plane?

- 8) A heavy box is pulled across a wooden floor with a rope. The rope makes an angle of 60° with the floor. A force of 75 N is exerted on the rope. What is the component of the force parallel to the floor?
- 9) An airplane flies toward $N59^\circ W$ at 525 km/h. What is the component of the plane's velocity
- toward North?
 - toward West?
- 12) A hiker walks 14.7 km at an angle of 305° from east. Find the east-west and north-south components of this walk.
- 13) A net force of 55 N acts due west on an object. What single force on the object produces equilibrium?
- 14) Two forces act on an object. One force is 6.0 N horizontally. The second force is 8.0 N vertically.
- Find the magnitude and direction of the resultant.
 - If the object is in equilibrium, find the magnitude and direction of the force that produces equilibrium.
- 15) A 62-N force acts at 30° and a second 62-N force acts at 60° .
- Determine the resultant force.
 - What is the magnitude and direction of the force that produces equilibrium?
- 16) Two forces act on an object. A 36-N force acts at 225° . A 48-N force acts at 315° . What would be the magnitude and direction of their equilibrant?