

Vector Practice Problems **KEY**

Name _____

Draw vector diagrams to solve each problem.

- 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?

Resultant Force ≈ 207 N Direction $\approx 52.85^\circ$

- 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 displacement of the explorer (current distance from the starting point)?

a) Total Distance = 34 km b) Displacement ≈ 20.6 km

- 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?

a) Resultant Velocity ≈ 18.36 m/s; Direction $\approx 29.36^\circ$

b) Time = 8.5 sec c) Distance ≈ 76.5 m

- 4) A 62-N force acts on an object at 30° and a second 62-N force acts at 60° . Determine the resultant force.

Resultant Force ≈ 119.78 N

- 5) 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 the resultant force?

Resultant Force ≈ 60 N Direction $\approx 278.13^\circ$

- 6) 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?

Resultant Velocity ≈ 128.16 km/h Direction $\approx 52.85^\circ$

- 7) 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? What direction (angle) does the crate go?

Resultant Force ≈ 434.07 N Direction $\approx 348.52^\circ$

- 8) Three people are pulling on a tree.

The first person pulls with 15 N at 65° ; the second with 16 N at 135° ; the third with 11 N at 195° .

What is the magnitude and direction of the resultant force on the tree?

Resultant Force ≈ 27.02 N Direction $\approx 125.26^\circ$