

Vectors

Homework Worksheet

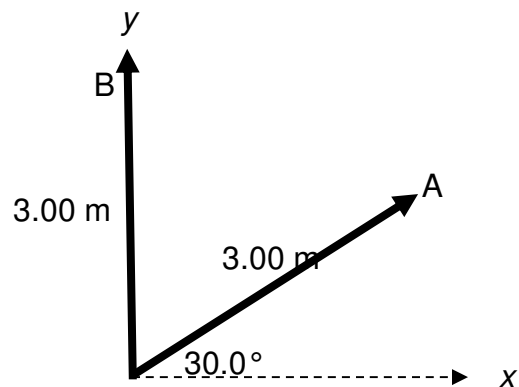
I. Graphical Solutions – Draw the diagrams only

1. A roller coaster moves 85 m horizontally, then travels 45 m at an angle of 30.0° above the horizontal. What is its displacement from its starting point? Use graphical techniques.
2. A novice pilot sets a plane's controls, thinking the plane will fly at 2.50×10^2 km/h to the north. If the wind blows at 75 km/h toward the southeast (45.0°), what is the plane's resultant velocity? Use graphical techniques.
3. While flying over the Grand Canyon, the pilot slows the plane's engines down to one-half the velocity in the question above. If the wind's velocity is still 75 km/h toward the southeast, what will the plane's new resultant velocity be? Use graphical techniques.
4. Vector **A** is 3.00 units in length and points along the positive x -axis. Vector **B** is 4.00 units in length and points along the negative y -axis. Use graphical methods to find the magnitude and direction of the following vectors:

- A. **A + B**
- B. **A - B**
- C. **A + 2B**
- D. **B - A**

5. Each of the displacement vectors **A** and **B** shown in the diagram to the right has a magnitude of 3.00 m. Graphically find the following:

- A. **A + B**
- B. **A - B**
- C. **B - A**
- D. **A - 2B**



6. A dog searching for a bone walks 3.50 m south, then 8.20 m at an angle of 30.0° north of east, and finally 15.0 m west. Use graphical techniques to find the dog's resultant displacement vector.
7. A ship leaves its home port expecting to travel to a port 500 km due south. Before it can move, a severe storm comes up and blows the ship 100 km due east. How far is the ship from its destination? In what direction must the ship travel to reach its destination?
8. A hiker leaves camp and, using a compass, walks 4 km E, 6 km S, 3 km E, 5 km N, 10 km W, 8 km N, and 3 km S. At the end of three days, the hiker is lost. Draw a diagram and compute how far the hiker is from camp and what direction should be taken to get back to camp.