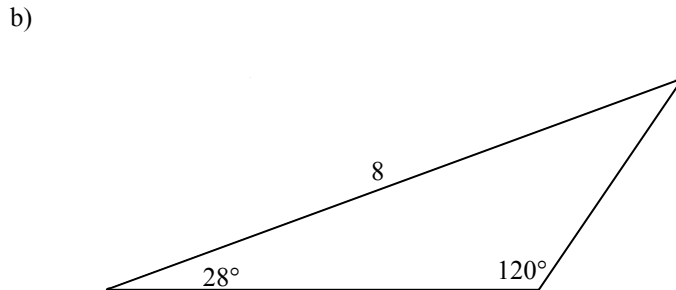
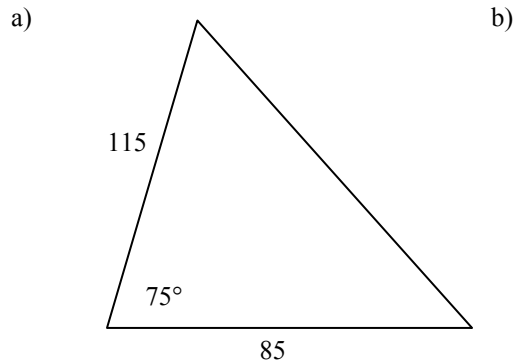


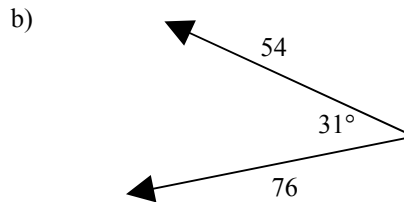
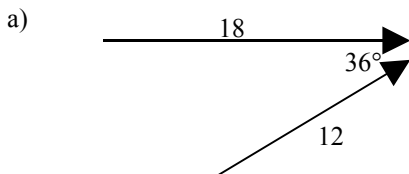
Physics 20

Chapter 6 Vector Practice Problems Worksheet

1. Use the cosine and sine laws as necessary to calculate all the unknown sides and angles for the following triangles (note, these drawings are **not** to scale).



2. Take the following vectors and add them together to find the resultant.



3. The airspeed of a small plane is 200 km/h. The wind speed is 50.0 km/h from the West (remember, that means it's blowing to the East). Determine the velocity of the plane relative to the ground if the pilot keeps the plane pointing in each of the following directions.

- a) East *250 km/h [E]*
- b) West *150 km/h [W]*
- c) North *206 km/h [N14°E]*
- d) North 40° East *235 km/h [E41°N]*
- e) West 16° South

4. A swimmer can swim at a speed of 1.80 m/s in still water. If the current in a river 200 m wide is 1.00 m/s [E], and the swimmer starts on the south bank and swims so that she is always pointing directly across the river, determine each of the following.

- a) The swimmer's resultant velocity, relative to the river bank. *2.06 m/s [N29°E]*
- b) How long she will take to reach the north shore. *111s*
- c) How far downstream she will land (from the point opposite her starting point). *111 m [E]*

5. A swimmer on the south shore of a river wishes to swim to a dock directly north of her starting point. Her maximum swimming speed in still water is 4.0 km/h and there is a current in the river flowing 2.5 km/h towards the west.

- a) In which direction must she swim so she goes straight north across the river? *[N39°E]*
- b) If the river is 2.0 km wide, how long does it take her to cross? *0.65 h or 39 min*

6. A pilot wishes to make a flight of 300 km [NE] in 45 minutes. When he checks with the meteorological office he finds out there will be a wind of 80 km/h from the north the whole way. What heading and airspeed should he use for the flight? *460 km/h [E52°N]*