Vector Addition Questions

For some questions, you will need to use the equation $\vec{v} = \frac{\vec{s}}{t}$

1. A car travels south 5.0 km and east 8.0 km. Determine the displacement of the car.

2. A cyclist travels north for 2.0 km and then turns right 45°. He then continues in this direction for 4.0 km before turning again to travel 3.0 km south.
   (a) Determine the final displacement of the cyclist from his starting point
   (b) Calculate the distance the cyclist travelled in this time.

3. A cyclist goes north at 20 kmh^{-1} for 1.5 hours and then north 30° east at 30 kmh^{-1} for 0.50 hours.
   (a) Determine the final displacement of the cyclist.
   (b) Determine the average velocity of the cyclist over the 2.0 hours.

4. A jet flies north at 1000 kmh^{-1}. It is, however, blown west by a 160 kmh^{-1} wind.
   (a) Determine the resultant velocity of the aircraft.
   (b) If it took 3.0 hours to complete the journey, calculate the displacement after 3.0 hours.
   (c) Determine how far off course the aircraft would be.

5. A man wishes to row a boat directly across a river, from south to north. The river flows from east to west with a current of 2.5 kmh^{-1}. If the man can row in still water with a speed of 6.5 kmh^{-1}:
   (a) Determine the resultant velocity of the boat.
   (b) Determine which direction he must point his boat if he is to arrive at the opposite bank directly opposite his starting point.
   (c) Calculate how long he will take to reach the opposite bank if the river is 120 m wide.