Motion and Force in a Gravitational Field

Revision Problems 1: Vectors

Due: _____

Name: _____ **(20 marks)**

1. Sam is out walking for exercise. He walks 2.50 km South then 3.30 km East.
   a. Calculate his displacement. (3 marks)

   b. If the walk took 30.0 minutes, calculate his velocity. (2 mark)

2. Jennifer is running laps around the 4.00×10^2 m circular track. She finds on average that it takes her 1.12 minutes to do a lap. Work out Jennifer's velocity when she is one quarter of the way around the track. (4 marks)

3. Ashley throws a 0.200 kg tennis ball against the wall of a house watched by Toby. The ball hits the wall at 5.00 ms^{-1} East and rebounds with a velocity of 3.50 ms^{-1} West. Toby determines that the change in velocity took 2.00×10^{-2} s. Calculate the force of the wall on the ball. (3 marks)

4. Lukah is driving her new car at 54.0 kmh^{-1} West when she rounds a corner to be travelling at 39.6 kmh^{-1} North. If the change in velocity took 2.80 s, what was the car's acceleration around the corner? (4 marks)

5. Kristian is flying a model airplane attached to a string. The string is at an angle of 35.0^0 to the horizontal and has a tension of 69.0 N. Determine the horizontal and vertical components of the tension. (2 marks)

6. A boy on a bike is free-wheeling down a hill which has a slope of 35.0^0. The mass of the boy and his bike is 90.0 kg. Assuming no friction, calculate the force accelerating him down the hill. (2 marks)