Chapter 4

1- Car A is moving with a speed of 30 km/h along the positive x-axis and car B is moving with a speed of 40 km/h along the positive y-axis. What is the velocity of car B with respect to car A? [(-30i + 40j) km/h]

2- A ball leaves the ground with a speed of 50 m/s at an angle of 60 degrees with the horizontal. Find its speed at its highest point. [25 m/s]

3- A stone is thrown from the ground into the air with an initial velocity V = (5.0i + 9.0j) m/s. To what maximum height will the stone rise? [4.1 m]

4- A particle starts from the origin at t = 0 with a velocity of 8.0j m/s and moves in the XY plane with a constant acceleration of (4.0i +2.0j)m/s**2. At the instant the X coordinate of the particle is 32 m, find its y coordinate. [48 m]

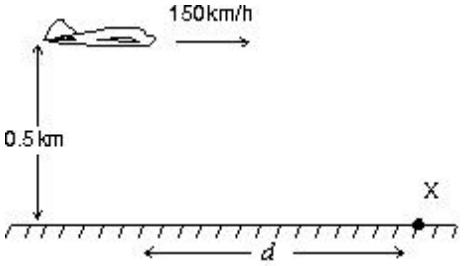
5- A stone is thrown horizontally from the top of a 40m high hill. It strikes the ground at an angle of 30 degrees. With what speed was it thrown? [49 m/s]

6- A river has a steady flow of 0.30 m/s. A student swims downstream a distance of 1.2 km and returns to the starting point. If the student can swim at a constant speed of v in still water and the downstream portion of the swim takes him 20 minutes, the time required for the entire swim is: [70 minutes]

7- Find the magnitude of the centripetal acceleration of a particle on the tip of a fan blade, 0.150 m in radius, rotating at 1200 revolutions every minute. [2370 m/s**2]

8- A boat can travel with a velocity of 1.70 m/s in still water (that is Vbw = 1.70 m/s). The boat heads (points) across a river where the current is 0.75 m/s (that is Vwg = 0.75 m/s). What is the speed of the boat relative to the ground? [1.86 m/s]

9- The airplane shown is in level flight at an altitude of 0.50 km and a speed of 150 km/h. At what distance d should it release a heavy bomb to hit the target X? Take g = 10 m/s2. [417 m]



10- An object is moving on a circular path of radius π meters at a constant speed of 4.0 m/s. The time required for one revolution is: [$\pi^2/2$ s]