Physics 2314, Homework #2 (due 1/31)

Multiple choice questions

M1 What is constant in uniform circular motion? (There can be more than one correct answer.)

    A. speed

    B. velocity

    C. acceleration

    D. the magnitude of acceleration

M2 (a) For a projectile with a fixed initial speed, if the launch angle increases from $30°$ to $60°$, the horizontal range

    A. decreases.

    B. doesn't change.

    C. increases.

(b) For a projectile with a fixed initial speed, if the launch angle increases from $30°$ to $60°$, the maximum height

    A. decreases.

    B. doesn't change.

    C. increases.

Problems

P1 A rock thrown from the ground level with an initial velocity of 10 m/s at an angle of 60°, hits the target at a height of 2.5 m above the ground. How far away is the target?

P2 In an artificial waterfall, water flowing at 2 m/s leaves the end of a horizontal channel at the top of a vertical wall $h = 3$ m high, and falls into a pool. How far away from the wall is the point where the falling water enters the pool?

P3 A particle is moving in a circle of a radius of 2 m with a constant speed of 2 m/s. Find the radial acceleration of the particle.

P4 A car travels with a speed of 60 km/h. Raindrops are falling at a constant speed vertically with respect to the Earth. The traces of the rain on the side windows of the car make an angle of 60° with the vertical. Find the velocity of the rain with respect to the (a) car and (b) the Earth.

P5 Two particles simultaneously begin to move from the same position with zero initial velocities and constant accelerations of 3 m/s^2 and 4 m/s^2 at an angle of 90° with respect to each other. Find the distance between the particles after 10 s.