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NAME: _____

PHYSICS 50 WINTER 2010 EXAM 1 1. A projectile is thrown from the edge of a building with an initial speed of 65.0 m/s at an angle of 37° with the horizontal. The height of the building is 150 m. See figure below. (10 pts)



- a) Calculate the time for the projectile to strike the ground.b) Calculate the range X of the projectile.

- 2. A speeding motorist zooms through a 50 km/h zone at 75 km/h, without noticing a police car by the roadside. The police car immediately begins to chase the speeding motorist with an acceleration of 7.0 m/s². (10 pts)
 - a) Calculate the time it takes the police car to catch speeding motorist.
 - b) Calculate how far the police car has to travel to catch speeding motorist.
 - c) Calculate the speed of the police car when it catches the speeding motorist.

- 3. A clock has a second hand of length 20 cm. From the 12 P.M mark to the 9 P.M mark, for the tip of the second hand, :
 - a) Calculate the displacement vector in unit-vector notation.
 - b) Calculate the average velocity vector in unit-vector notation.
 - c) Calculate the period of rotation.
 - d) Calculate the speed.
 - e) Calculate the instantaneous acceleration vector in unit-vector notation as it passes through the 6 P.M mark.
 - f) Calculate the average acceleration vector in unit-vector notation.

- 4. A physics student whirls a stone in a horizontal circle of radius 1.5 m and at a height of 2.0 m above the ground. The string breaks and the stone flies off horizontal and strikes the ground after traveling a horizontal distance of 10 m.
 - a) Calculate the time for stone to strike the ground after string breaks.
 - b) Calculate the centripetal acceleration of stone while moving in its circular motion.