AP Physics 1
1.7 – Projectile Motion
Assessment

Aim high when doing physics!

Name: _____   Period:_____

1. A ball is thrown from a point 1 m above the ground. The initial velocity is 20 m/s at an angle of 40 degrees above the horizontal.
   a. Find the maximum height of the ball above the ground.
   b. Calculate the speed of the ball at the highest point in the trajectory.

2. A dolphin leaps out of the water at an angle of 35° above the horizontal. The horizontal component of the dolphin's velocity is 7.7 m/s. Find the magnitude of the vertical component of the velocity.

3. A skateboarder shoots off a ramp with a velocity of 6.6 m/s, directed at an angle of 58° above the horizontal. The end of the ramp is 1.2 m above the ground.
   a. How high above the ground is the highest point that the skateboarder reaches?
   b. When the skateboarder reaches the highest point, how far is this point horizontally from the end of the ramp?

4. A fire hose ejects a stream of water at an angle of 35.0^o above the horizontal. The water leaves the nozzle with a speed of 25.0 m/s. Assuming that water behaves as a projectile, how far from a building should the fire hose be located to hit the highest possible fire?

5. A ball is thrown upward at a speed v_o at an angle of 52° above the horizontal. It reaches a maximum height of 7.5 m. How high would this ball go if it were thrown straight upward at v_o?

6. An archer shoots an arrow with a velocity of 30 m/s at an angle of 20 degrees with respect to the horizontal. An assistant standing on the level ground 30 m downrange from the launch point throws an apple straight up with the minimum initial speed necessary to meet the path of the arrow.
   a. What is the initial speed of the apple?
   b. What time after the arrow is launched should the apple be thrown so that the arrow hits the apple?

7. A baseball player hits a homerun (obviously not a player from the University of Florida!). The ball lands in the left field seats, which are 120 m away from the point at which the ball was hit. The ball lands with a velocity of 20 m/s at an angle of 30° below horizontal.
   a. Find the initial velocity and the angle above horizontal with which the ball leaves the bat.
   b. Find the height of the ball relative to the ground.