

### More Projectile Motion (Assignment 10)

For each situation below, draw a picture and label the initial height, initial velocity, horizontal velocity, initial vertical velocity, and angle of trajectory.

1. A swimmer runs and jumps off of a dock at an angle of 20 degrees to the water with a velocity of 14 feet per second. The dock is elevated 2 feet above the water.

a) How high above the water will the swimmer be when his horizontal distance from the edge of the dock is 3 feet?

b) How far from the edge of the dock will the swimmer be when he hits the water?

c) What is the maximum height above the water the swimmer will reach?

2. Evel Knievel, the famous American daredevil, is planning on jumping from one end of the Grand Canyon to the other on his motorcycle. The end of the ramp he has set up is 25 feet off of the ground, and it will launch him at an angle of 35 degrees. He is capable of hitting a speed of 161 feet per second on takeoff. There is no landing ramp on the other side of the canyon.

a) What is the maximum height that Evel Knievel will reach above the ground where he took off? If the bottom of the canyon is 5,400 feet below the top, how far will he fall if he doesn't make it to the other side?

b) What would his vertical velocity be upon impact if he didn't make it?

c) What would his velocity be upon impact if he didn't make it?

d) If the Grand Canyon where Evel Knievel is jumping is 770 feet wide, will he make it? (Note: It's actually about 30 times wider than that at its thinnest point...there's no way he would really make it if he tried, which he never did.)

3. A golfer drives a shot off the tee at an angle of 30 degrees with an initial velocity of 190 feet per second.

a) How long will the ball be in the air before it first hits the ground?

b) If the green is 1,060 feet away from the tee, how far would the ball have to roll after first hitting the ground in order to end up on the green?

c) Label each of the following statements as "true" or "false."

At its highest point, the velocity and acceleration of the ball are 0.

At its highest point, the horizontal velocity of the ball is zero.

At its highest point, the vertical velocity of the ball is zero.

The horizontal velocity remains constant throughout the flight of the ball.

The acceleration of the ball remains constant throughout the flight of the ball.