Nonlinear Motion   Name _____ _____ Period _____
Note: Use g = 10 m/s²

Projectile Motion – Cliff
1.   A rock is thrown horizontally at 25 m/s from a roof that is 15 m high. How long does it take to hit the ground? How far does the rock go
        horizontally before hitting the ground?

2. A baseball is thrown from the roof of a building at 20 m/s in a horizontal direction. It strikes the ground 2.8 s later. Find
(a)   How far from the building the baseball lands

(b) The height of the building.

3. A baseball is thrown horizontally from a window that is 220 m high. If the initial horizontal speed of the ball is 18m/s, find
(a)   How long the ball takes to reach the ground

(b) How far from the building it lands.

4. Goofy the clown wants to perform a new trick. He wants to find out how fast he has to run in order to hit a container of water that is placed 47 m
        from the base of a 270 m tall building. How fast does Goofy need to run?

Projectile from Ground
1. A football punter kicks a ball at 40 m/s at an angle of 45°. His foot connects with the ball at 1 m above the ground.
(a)   What is the ball's initial vertical velocity?

(b) What is the ball's initial horizontal velocity?

(c) How long until it reaches the top of its flight?

(d) How high does it go?

(e) How long until it hits the ground?

(f) What is the total distance that it travels?

2. A howitzer in a bunker shoots a round at 150 m/s at 30º.
(a)   What is the ball's initial vertical velocity?

(b) What is the ball's initial horizontal velocity?

(c)How long until it reaches the top of its flight?

(d) How high does it go?

(e) How long until it hits the ground?

(f) What is the total distance that it travels?

3. A clown throws a ball into the air with a velocity of 52 m/s at an angle of 60 degrees above the horizon.
(a)   What is the ball's initial vertical velocity?

(b) What is the ball's initial horizontal velocity?

(c)How long until it reaches the top of its flight?

(d) How high does it go?

(e) How long until it hits the ground?

(f) What is the total distance that it travels?