Name_

Unit 4.5: Worksheet 1

Date _____ Pd____

- 1. A projectile is launched at a 30^{0} angle with an initial velocity of 14 m/s.
 - a. Solve for the amount of time it takes the projectile to reach the top of its arc.
 - b. Solve for the amount of time it takes the projectile to reach the ground from the top of the arc.
 - c. Solve for the total time of flight.
- 2. Another projectile is launched at a 30° angle with an initial velocity of 14 m/s.
 - a. Write out the equation that gives the y-position with respect to time.
 - b. Solve for the time when y-position equals zero.
 - c. Compare your answers to 1c and 2b and explain the results.
- 3. Suppose a metal sphere rolls down a ramp, and leaves the ramp with v = 1.5 m/s. The bottom end of the ramp is 0.9 m above the floor. Calculate the horizontal range of the sphere.

15° —

- 4. An antitank gun is located on the edge of a plateau that is 60m above the surrounding plain. During a training exercise, an enemy tank a placed stationary on the plain and at a horizontal distance of 2.2 km from the gun. The cannon is set to an angle of 30^o above the horizontal.
- a. A practice round is shot, and the round reaches the apex its path of travel after 12.24 s. Calculate the muzzle velocity of the cannon.

b. In the second training exercise, the cannon is locked into an angle of 10⁰ above the horizontal. Calculate how far away from the cliff's edge the cannon will hit.

c. And this time, the tank begins to accelerate away from the gun with an acceleration of 0.9 m/s². Calculate how long should the crew wait before firing in order to hit the tank.

5. Prove that the range of a projectile launched from the ground can be given by $R = (v_0^2 \sin 2\theta)/g$. (*hint*: $\sin 2\theta = 2 \sin \theta \cos \theta$ -*trig identity*)