Non-Symmetrical Projectile Motion 2

1. (Walker. p. 101 #37) On a hot summer day, a young girl swings on a rope above the local swimming hole. When she lets go of the roper her initial velocity is 2.25 m/s at an angle of 35.0° above the horizontal. If she is in flight for 1.60 s, how high above the water was she when she let go?

2. A projectile is fired from the ground with an initial speed of 200 m/s and lands 2000m away. Calculate the launch angle θ, necessary to strike the target. What other angle will work? Calculate the total time in the air for each angle. What is the final velocity of the projectile in rectangular form? At what time does the object reach its maximum altitude? What is the maximum height the projectile reaches?

3. A projectile is fired from a height of 25 meters above the ground at an angle of 30 degrees and lands 25 meters away. What is the initial velocity in rectangular form? How long is the projectile in the air until it hits the ground? At what time is the object at its maximum height? What is its maximum altitude? What is the object's final velocity in rectangular form?

4. (Walker. p. 99 #7) An archer shoots an arrow horizontal at a target 15 m away. The arrow is aimed directly at the center of the target, but it hits 52 cm lower. What was the initial speed of the arrow?

5. A hockey puck struck at ice level just clears the top of the glass wall that is 2.8 m high. The flight time to this position is .65 s, and the horizontal distance is 12.0 m. A) Find the initial speed of the puck, and B) the maximum height it will reach.

6. An airplane moves horizontally to the right with a constant velocity of 115 m/s at an altitude of 1050 m. The plane releases a "care package" that falls to the ground, along a curved trajectory. Ignoring drag (air resistance), determine the **time** required for the package to hit the ground. Find the magnitude of the **velocity** of the package and the **direction** of the velocity vector just as the package impacts with the ground.

7. Two projectiles are fired toward each other from the ground, each with an initial speed of 20 m/s at an angle of 35 degrees. If the projectiles are initially 54 meters apart, determine the time that the projectiles collide and the displacement of the projectile fired from the left.

8. A gun can shoot jelly beans a **maximum** distance of 9 m. What **two** launch angles will hit a target 5 m away and at the same level as the gun. (Assume that the muzzle velocity of the gun cannot be changed!!)

9. A Projectile is fired downward at an angle of 15 degrees below the horizontal. It is launched from a height of 60 m and land 60 m away. At what initial velocity was it fired? (In rectangular form.) What is the total time the projectile is in the air? What is the final velocity in rectangular form?