3 Falling Bodies

Name_____

Worksheet B: Problems

Inquiry Physics

1. A stone is shot straight upward with a speed of 24.4 m/s from a tower and lands at the base of the tower with a speed of 44.0 m/s. How long does it take?
   6.98 seconds

2. A nut comes loose from a bolt on the bottom of an elevator as the elevator is moving **up** the shaft at 3.00 meters/second. The nut strikes the bottom of the shaft in 2.00 seconds.
   a) How far from the bottom of the shaft was the elevator when the nut fell off?
      13.6 meters

   b) How far above the bottom was the nut 0.250 seconds after it fell off?
      14.0 meters

3. A bottle dropped from a balloon reaches the ground in 5.00 seconds.
   a) Determine the height of the balloon when the bottle was released if the balloon was at rest in the air when the bottle was dropped.

   b) Determine the height of the balloon when the bottle was released if the balloon was **rising** at a speed of 2.00 meters/second when the bottle was released, and the bottle still took 5.00 seconds to reach the ground.

4. A baseball is thrown straight upward with a speed of 30.0 meters/second.
   a) How long will it rise?

   b) How high will it rise?

   c) How long after it leaves the hand will it return to the starting point? EXPLAIN OR SHOW WORK!

   d) When will its speed be 16.0 meters/second? THERE ARE TWO ANSWERS TO THIS QUESTION; **CALCULATE THEM BOTH**.
   1.43 seconds and 4.69 seconds

5. An angry Physics student decides to throw an egg onto the head of poor Mr. M. The student leans out of a school window 19.6 m above the head of the approaching instructor.
   a) Determine how many seconds before the teacher is directly under him that he will have to drop the egg in order to get the desired splat.

   b) If the student decided to throw an egg downward, and it struck Mr. M after 1.20 seconds, what was the initial **velocity** of the egg? REMEMBER THAT A VELOCITY INCLUDES A DIRECTION