Assignment 5

A police officer fires a warning shot straight up into the air. He is holding the gun 7 feet above the ground, and the bullet leaves the gun at a velocity of 2,880 feet per second.

1. Based on the information above, what do the following variables equal?

$$h_i =$$ $$v_i =$$ $$a =$$

2. Using your answer to question 1, write an equation relating the height of the bullet above ground in feet, h, to the time since the bullet was fired in seconds, t.

3. How high above ground will the bullet be 2 seconds after it was fired?

4. How high above the ground will the bullet be 20 seconds after it was fired?

5. When will the bullet be 100 feet in the air?

6. Explain why there are two different answers to question 5.

7. When will the bullet be 129,607 feet in the air?

8. What do you know about the height 129,607 based on your answer to question 7? Explain.

9. When will the bullet hit the ground?

Leaning outside an 8th story window 96 feet above the ground, you throw a set of keys down to your friend. You toss them with an initial downward velocity of 10 feet per second.

10. Write an equation relating the height of the keys above the ground in feet, *h*, to the time since you threw them in seconds, *t*.

11. How high above ground are the keys after 1 second? How far does this mean they have fallen?

12. Your friend has is waiting to catch the keys with her hands cupped 4 feet above the ground. How long will it take from the time you threw them for the keys to hit her hands?

13. What will the impact velocity be when the keys hit her hands?

You toss a ball straight up into the air from a height of 5 feet above ground.

14. Leaving v_i as a variable, write an equation relating the height of the ball above the ground in feet, *h*, to the time since you threw it in seconds, *t*.

15. If you catch the ball 5 feet above the ground exactly 2 seconds after you threw it, what was its initial velocity?