

Name _____

Per _____

Date _____

Constant Acceleration - Free Fall

1. Mr. Klein throws a ball straight up in the air with an initial velocity of 20 m/s.
 - a. How long will it take the ball to reach its highest point?
 - b. What is the maximum height reached by the ball?
 - c. How many total seconds is the ball in the air?

2. Your BFF, Mr. Schuck, is playing soccer, and you see him kick the ball straight up in the air. It takes 3.5 seconds for the ball to reach its highest point.
 - a. What was the initial velocity of the ball?
 - b. What is the maximum height reached by the ball?
 - c. What is the total time the ball is in the air?
 - d. What is the velocity of the ball just as it reaches the ground again?

3. Mr. Froner is playing golf and he accidentally hits the golf ball straight up in the air with an initial velocity of 42 m/s.
 - a. How long does it take the ball to reach its highest point?
 - b. What is the maximum height reached by the ball?
 - c. After only 1.5 seconds, what is the velocity of the ball?
 - d. What is the acceleration of the ball at its highest point?

4. Mr. O'Connor throws a pen straight up in the air with some initial velocity. 2.3 seconds later, it has a velocity of 17 m/s.
 - a. What was the initial velocity of the pen?
 - b. What is the maximum height reached by the pen.
 - c. What is the velocity of the pen 6 seconds after it was thrown?
 - d. In part c, is the pen on the way up or on the way down? How do you know?

5. Mr. Ost tosses a football straight up in the air, and then catches it 5 seconds later. (She catches it at the same height from which it was tossed.)
- How many seconds does it take the ball to reach its maximum height?
 - What was the initial velocity of the ball?
 - What was the maximum height of the ball?
6. Ms. Cordova tosses a stuffed teddy bear straight up in the air, and then catches it 3.2 seconds later.
- What is the teddy bear's displacement after 3.2 seconds?
 - What is the teddy bear's initial velocity?
 - What is the maximum height reached by the stuffed animal?

7. Ms. Mischenko has a tennis ball that she throws straight up. The tennis ball reaches a maximum height of 30 meters above its release point
- How long would it take the tennis ball to fall back down from its maximum height? (What is the ball's velocity at the top of its trajectory?)
 - How long did it take the ball to reach this maximum height?
 - What was the initial velocity of the ball?
8. A cat is thrown down off a cliff that is 77 meters high with some initial speed. After 3.2 seconds it safely hits the ground where someone has conveniently placed a cushiony pillow. At what speed was the cat initially thrown at?

1. a) 2.04 s b) 20.4 m c) 4.08 s
2. a) 34.3 m/s b) 60.02 m c) 7.0 s d) -34.3 m/s
3. a) 4.29 s b) 90 m c) 27.3 m/s d) -9.8 m/s²
4. a) 39.54 m/s b) 74.76 m c) -39.54 m/s
5. a) 2.5 s b) 24.5 m/s c) 30.63 m
6. b) 15.68 c) 12.54 m
7. a) 2.47 s b) 2.47 s c) 24.24 s
8. -8.38 m/s