**Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**October 15th, 2012**

**AP Calculus 1, Mrs. Sulkes**

**3.3 Higher Order Derivatives and Other Practice**

Use the info on p. 146 to fill in the notation for each higher order derivative below:

**1st derivative:     **

**2nd derivative:**

**3rd derivative:**

**4th derivative:**

**nth derivative:**

**Examples:**

1. Find the second derivative of:
2. ** b. **
3. Find the fourth derivative of: ****

**Some Review and Practice:**

1. Find the derivative of each function:

1.  (Hint: rewrite first)
2. 
3. 
4. 
5. 

2. Suppose a diver jumps from a diving board that is 32 feet high. If the diver’s initial velocity is 12 feet per second, what is the equation for the height above the water at any time t? Next, answer the following questions. Include proper units in your answers.

a. When does the diver hit the water?

b. How high does the diver go?

c. What is the velocity of the diver after ½ second?

d. What is the velocity of the diver when he hits the water?

e. What is the average velocity from ½ to 1 second?

1. What is the acceleration of the diver when he hits the water? (Hint: use higher order derivatives)

3. In order to evaluate these limits, you can use the fact that each of the following limits represent the derivative of some function **** at some number **c**.

* First, state .
* Next, state **c.**
* Then use the derivative rules to evaluate the limit!

a.  b. 

c.  d. 