Name:_____

12.3 Homework

$$m = \lim_{h \to 0} \frac{f(x+h) - f(x)}{h}$$

$$v(t) = \lim_{h \to 0} \frac{f(t+h) - f(t)}{h}$$

1) Find an equation for the slope of the graph at any point of $f(x) = 3x^2 - 4x - 5$

2) Find an equation for the slope of the graph at any point of $f(x) = -5x^2 + 3x - 7$

3) Find an equation for the slope of the graph at any point of $f(x) = -4x^3 + 6$

4) Find the slope of the line tangent to the graph $y = 1 - x^2$ at the point (2, -3).

5) Find the slope of the line tangent to the graph $f(x) = \frac{1}{x}$ at the point $\left(3, \frac{1}{3}\right)$

6) Abby drops a ball from a tower that is 800 feet high. The position of the ball after t seconds is given by $s(t) = -16t^2 + 800$. How fast is the ball falling after 1.5 seconds?

7) An outfielder throws a ball toward home plate with an initial velocity of 80 feet per second. Suppose the height h of the baseball, in feet, t seconds after the ball is thrown is modeled by $h(t) = -16t^2 + 80t + 6.5$.

a. Find an expression for the instantaneous velocity $v(t)$ of the baseball.

b. How fast is the baseball traveling after 0.5 second?

c. For what value of t will the baseball reach its maximum height?

d. What is the maximum height of the baseball?