2-7 Part 2 Lesson Notes Name: _____

Derivatives and Rates of Change

1 Definition The **tangent line** to the curve $y = f(x)$ at the point $P(a, f(a))$ is the line through P with slope

$$m = \lim_{x \to a} \frac{f(x) - f(a)}{x - a}$$

provided that this limit exists.

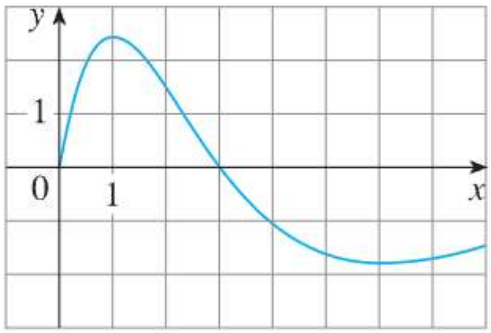
$$m = \lim_{h \to 0} \frac{f(a + h) - f(a)}{h}$$

The tangent slope at any point (a, f(a)) is referred to by the notation f '(a).

f '(a) means: The derivative of f(x) at some point x=a / The tangent slope at any point x=a / The instantaneous rate of change at x=a.

1. Write the equation of a line tangent to f(x) at x=1 if f(1)=2 and f '(1)= -3.

2. a. Order the values from least to greatest: f '(1), f '(3), f(1), f(1/2), f '(6), f '(1/2)



b. T/F i. f(0)=f '(1) ii. f '(2)> f '(6) iii. f '(1)> f '(4)

3. On a plasnet with a different gravitaional pull, a rock is thrown with initialvelocity 10 m/s and the height of the rock is given as $h(t) = 10t - 2t^2$.

a.) Find the instantaneous velocity at any time t=a.

b.) Find the instantaneous velocity at any time t=1 second.

c.) Find the average velocity from t=1 second to t=3 seconds.

d.) How fast is the rock moving when it hits the ground?