Calc II Recitation D **Name: _____**

Recitation One: 6/30/2015

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Objectives:
1. Hello!
2. Definition of Derivative
3. Differentiation Rules (**Chain Rule**)!
4. Logarithms Are Nice
5. Implicit Differentiation
6. More Practice! & Notes!!

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1. Hello!

i. Me llamo Mateo
ii. Cellphones, Bathroom, Water
ii. TEAMSS!!! (AT MIT!) (Note to Self: 3 Teams, Two 3's – One 4)

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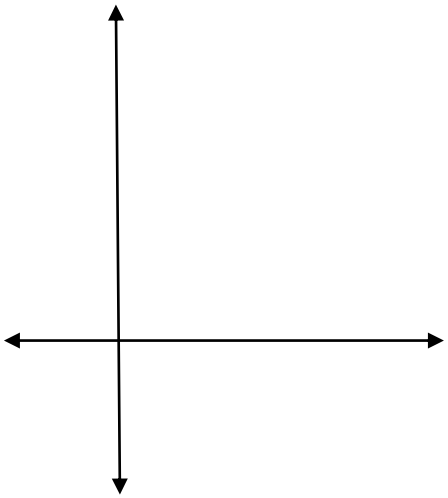
2. Definition of Derivative!



Secant Line:
A line that intersects a curve at _____ point(s).

Tangent Line:
A Line that intersects a curve at _____ point(s).

Equation:

2. Definition of Derivative Continued:

Procedure for Using in Proofs:

1.

2.

3.

4.

5.

Example One:

A tired man wearing a gray MIT shirt with black hair, whose name rhymes with Patt, is hunkered over walking down the street toward you muttering (hummna hummna derivative bahhhh! Grumble) He passes you and out of his pocket falls a piece of paper. Being the kind person that you are you pick it up with the intention of giving it back to him, **but then!!!** You see that is says **CASH MONEY!!!** $10,000 reward if you can prove the following derivative:

$$f(x) = \frac{1}{x} \qquad \frac{df(x)}{dx} = \frac{-1}{x^2}$$

Hot Dang! We want money!! Let's prove it!

Example Two: (Set-up Only)
Set up the definition of derivative proof of the following:

$$f(x) = \frac{y(x)}{p(x)}$$

$$\frac{dy(x)}{dx} = \frac{p(x)y'(x) - y(x)p'(x)}{p(x)^2}$$

Differentiation Rules:

1. Constant

2. Power

3. Product

4. Reciprocal

5. Quotient

6. CHAIN RULE!!!

Formula for computing the derivative of the composition of two or more functions!!!

Solving Procedure:

1.

2.

3.

Example Three:
Is the following a valid cancellation?

$$\frac{dy}{du} * \frac{du}{dx} = \frac{dy}{du} * \frac{du}{dx} = \frac{dy}{dx}$$

(Cancellations will be written on Board)

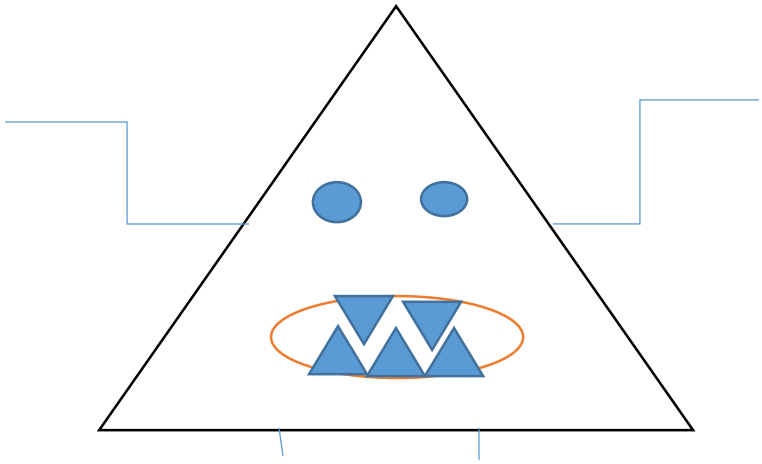
Example Four:
Take the derivative of the following:

$$h(x) = \frac{4}{(x^2 - 3)^2}$$

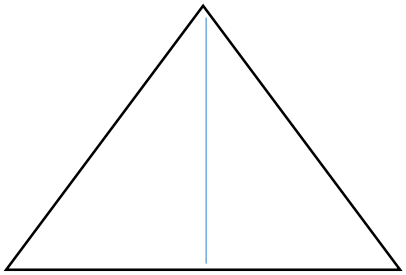
Example Five:
Take the derivative of the following:

$$y = (1 + (1 + x)^3)^4$$

Example Six:
You encounter a new Pokemon on your quest to become the Pokemon master. Its name is Trianglechu (Seriously Matt?) . It looks like this:



You are upset that the pokemon is literally just a 2D triangle with legs (and arms). What the heck pokemon creators?!! Why you do this!!?? Anyways, Trianglechu is growing pretty quickly and you are worried that it soon won't fit in your pokeball (We don't want an explosion of poke-meat). You take a second look at its cruddy pointy body (lol) and see that is it in fact a perfect equilateral and what's more the sides are growing at a rate of 2inches/second! What is the rate at which the area of your Trianglechu increasing if each of its sides are 10 inches? He will explode if he is growing at a rate greater than 4 inches/second. Will he explode?! We must know! (Be kind to animals)



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Logarithms are Nice:

Why it matters!
-Difficult derivatives!!

Example Seven (KBA Problem):
Compute the following limit

$$\lim_{x \to 0} x^x$$

Rules of Logs:

1.

2.

3.

4.

Derivative EQ:

Example Eight:
Take the derivative of the following function:

$$f(x) = (x+1) * \ln(\frac{1}{x^2+1})$$

Example Nine:
Take the derivative of the following function:

$$y = \mathrm{x}^{\cos(x)+2}$$

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Implicit Differentiation:

Finding Derivatives of the form _____ when your equation is given with _____ with _____.

Example Ten:

Which of the following are correct?

A. $y' = \frac{dy}{dx}$

B. $y''' = \frac{d^3y}{dx^3}$

C. $y' = \frac{dx}{dy}$

D. $y'' = \frac{d^2y}{dx^2}$

Example Eleven:

Find y'.

$$x^2y + y^3x + y = 2$$