Mr. Visca – AP Calculus AB

Unit 3: derivatives Review Notes

**Definition of Derivative:**



**Notation:**

y’ f’(x)

**Where differentiability (derivatives) don’t exist, even though function is continuous…**

Corner, Cusp, Vertical Tangent Line, or any discontinuity

FYI…if a function is differentiable, it MUST be continuous (the reverse is not always true)

Calculator Help: math, 8 = nDeriv



**Derivative Rules:**

Derivative of a constant

Basic Power Rule

Product Rule

Quotient Rule

Find the equation of the tangent line to the curve at the point (1, 2).

How do you find the second derivative?

y’’ f’’(x)

**Position vs Velocity vs Acceleration:**

A particle moves along a line so that its position at any time is s(t) = t2 - 4t + 3. (s in meters and t in seconds).

a) Find the displacement of the particle during the first 2 seconds?

b) Find the average velocity during the first 4 seconds?

c) Find the instantaneous velocity at t=4?

d) Find the acceleration at t=4?

e) Is the particle speeding up or slowing down at 4 seconds?

f) At what value of t does the particle change directions?

**Derivatives of Trig ☺ (“Do your chain hang low? Do it wobble to the flo’? Do it shine in the light? Is it platinum, is it gold?” - Jibbs)**

 = =

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We are ALWAYS doing the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ rule…whether we realize it or not!

An object moves along the x-axis so that its position at any time, t ≥ 0, is given by

x(t) = cos(t2+1). Find the velocity and acceleration of the object as a function of t.

Find the derivative of g(t) = tan(5 - sin2t)

**Implicit Differentiation**

When you can’t get “y =” alone

Take the derivative of x and y, except, when you take the derivative of y, you need to put

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ next to it

Ex. Find the equation of the tangent line to the ellipse x2 - xy + y2 = 7 at the point (-1, 2).

Find y'' if 2x3 - 3y2 = 8

**Derivatives of INVERSES**

 or

 =

If S is the inverse function of f, if f(x) = x3 + x, find S’(2)

**Derivatives of Trig Inverses:**



**Derivatives of Exponentials and Logs**

Part 1: No Calculator Allowed Chapter 3 Review

Show all your work!

1. If , find .

2. If , then 

3. If , then 

4. Explain why each graph below is not differentiable at x = 0.





5. If , then 

6. The is

7. If , find .

8. Find the slope of the tangent to the curve  at the point (3, 4).

9. 

Part 2: Graphing Calculator Required Chapter 3 Review

Show all your work!

10.

11.

12.



13.