Name____________________________________ Stuff You Must Know Cold – AP BC Calculus

Coach Stephens Room 1112

Limits

Notation for:

Limit from the left of $f(x)$ as $x \to a$

Limit from the right of $f(x)$ as $x \to a$

Definition of Continuity:

A function is continuous at the point x=a if and only if:

1.

2.

3.

Situations in which limits fail to exist:

Situations in which derivatives fail to exist:

Definition of e:

Extreme Value Theorem

Point-slope form

ln(1) = ln(e) =

[ ] *Closed Interval*

( ) *Open Interval*

Curve Sketching and Analysis

Critical Points:

Global Min:

Global Max:

Point of Inflection:

Derivatives

Definition of Derivative

$\frac{d}{dx}\left(f(x)\right) =$

Alternate Form of Def. of Derivative

$\frac{d}{dx}\left(f(x)\right) \, at \; x = a$

Chain Rule

$\frac{d}{dx}[f(u)] =$

Product Rule

$\frac{d}{dx}(uv) =$

Quotient Rule

$\frac{d}{dx}\left(\frac{u}{v}\right) =$

Where u and v are functions of x

More Derivatives

Where u is a function of x and a is a constant

$\frac{d}{dx}(x^n) =$

$\frac{d}{dx}(\sin u) =$

$\frac{d}{dx}(\cos u) =$

$\frac{d}{dx}(\tan u) =$

$\frac{d}{dx}(\cot u) =$

$\frac{d}{dx}(\sec u) =$

$\frac{d}{dx}(\csc u) =$

$\frac{d}{dx}(\ln u) =$

$\frac{d}{dx}(e^u) =$

$\frac{d}{dx}(\sin^{-1} u) =$

$\frac{d}{dx}(\cos^{-1} u) =$

$\frac{d}{dx}(\tan^{-1} u) =$

$\frac{d}{dx}(\cot^{-1} u) =$

$\frac{d}{dx}(a^u) =$

$\frac{d}{dx}(\log_a u) =$

$\frac{d}{dx}(sec^{-1}u)$

$\frac{d}{dx}(csc^{-1}u)$

Intermediate Value Theorem

Solution to dy/dt = ky

Name________________________________ Stuff You Must Know Cold – AP BC Calculus

Coach Stephens Room 1112

The Mean Value Theorem (derivatives) **The Fundamental Theorem of Calculus** **2nd FTC** $\frac{d}{dx}\int_a^{g(x)} f(t)dt =$ **Area Under The Curve (Trapezoids)** **Mean Value Theorem for Integrals** (Average Value) **Area between curves:** **Solids of Revolution and Friends** General volume equation Disk Method Washer Method Arc Length (rectangular) Cylindrical Shell Method	**Distance, Velocity, and Acceleration** s(t) is the position function, $< x(t), y(t) >$ is the position in parametric velocity vector = acceleration vector = speed (rectangular and parametric) = displacement (change in position) = distance travelled (rectangular and parametric) = new position average velocity = **l'Hôpital's Rule** (Bernoulli's Rule) **Euler's Method** **Integration by Parts** **Logistics** $\frac{dP}{dt} =$	**Parametric Equations** $\frac{dy}{dx} =$ $\frac{d^2y}{dx^2} =$ **Polar Curves** 4 conversions Area = Slope = Area Between Polar Curves= **When velocity and acceleration have the same sign, the speed of a particle is ___________. When they have opposite signs, the speed is ______________.** **The Slope of inverse functions are ______________of each other.** **If f(x) grows faster than g(x), then…** $\lim_{x\to\infty}\frac{f(x)}{g(x)} =$ **If f(x) grows at the same rate as g(x), then…** $\lim_{x\to\infty}\frac{f(x)}{g(x)} =$ $\int tanudu =$ $\int u^n du = \qquad n \neq -1$ $\int u^{-1} du =$