1st Quarter Concept Sheet

Name: _____

Date: _____ Pd: _____

I. Introduction Topics

Rates of Change

Average Rate of Change _____

_____

Relationship between Average Rate of Change and Instantaneous Rate of Change

_____

Instantaneous Rate of Change

i. **Calculus concept** _____
ii. **Geometric meaning** _____
iii. **Graphically** _____

_____

iv. **Numerically** _____

_____

Definite Integral

Geometric Meaning:

_____

Exact Method:

_____

Estimation Method: **(under or over estimate?)**

i. _____

ii. _____

II. Limits and Continuity

Limits at a Point

Formal Definition:

_____

Graphically: _____

_____

Numerically: _____

_____

Algebraically:

i. _____
ii. _____
iii. _____

Trig Limit Theorem: _____

_____

Piecewise Functions: _____

_____

Limits at Infinity

Graphically: _____

_____

Algebraically: _____

_____

Numerically: _____

_____

Continuity

Informal Definition: _____

_____

Discontinuities:

i. _____

_____

ii. _____

_____

iii. _____

_____

Continuity Test

i. _____

_____

ii. _____

_____

iii. _____

_____

III. Derivatives

Formal Definition:

_____

Alternative Definition:

_____

Limit Problems:

_____

How to write the equation of a tangent line:

_____

Physics Applications: _____

i. _____
ii. _____
iii. _____

Derivative Rules

c is a constant, *a* is a number, *n* is any number, and *u* is some function

$\frac{d}{dx}[c] =$ _____ $\frac{d}{dx}[x^n] =$ _____

$\frac{d}{dx}[c \cdot x] =$ _____ $\frac{d}{dx}[f(x) \pm g(x)] =$ _____

$\frac{d}{dx}[c \cdot f(x)] =$ _____

Product Rule: $\frac{d}{dx}[f(x)g(x)] =$ _____

Quotient Rule: $\frac{d}{dx}\left[\frac{f(x)}{g(x)}\right] =$ _____

Chain Rule: $\frac{d}{dx}[f(g(x))] =$ _____

$\frac{d}{dx}[u^n] =$ _____ $\frac{d}{dx}[\log_a u] =$ _____

$\frac{d}{dx}[a^u] =$ _____ $\frac{d}{dx}[\ln(u)] =$ _____

$\frac{d}{dx}[e^u] =$ _____

$\frac{d}{dx}[\sin u] =$ _____ $\frac{d}{dx}[\sec u] =$ _____

$\frac{d}{dx}[\cos u] =$ _____ $\frac{d}{dx}[\cot u] =$ _____

$\frac{d}{dx}[\tan u] =$ _____ $\frac{d}{dx}[\csc u] =$ _____

$\frac{d}{dx}[f^{-1}(u)] =$ _____ $\frac{d}{dx}[\tan^{-1}(u)] =$ _____

$\frac{d}{dx}[\sin^{-1}(u)] =$ _____ $\frac{d}{dx}[\sec^{-1}(u)] =$ _____