Unit 2 – Basic Derivative Rules

Limit Definition of the Derivative: Alternate Form:

Notations:

What the derivative tells us at $x = a$.

Differentiability vs Continuity

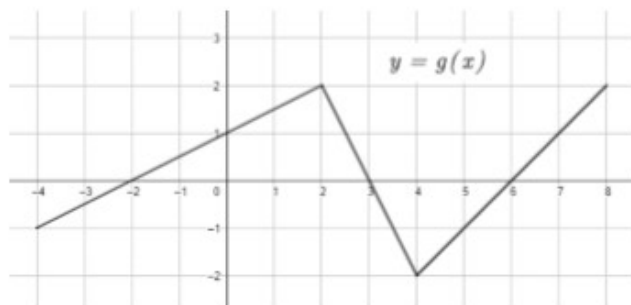| Power Rule	Product Rule	Quotient Rule
$\dfrac{d}{dx}[ax^n]$	$\dfrac{d}{dx}[f(x)g(x)]$	$\dfrac{d}{dx}\left[\dfrac{f(x)}{g(x)}\right]$
$\dfrac{d}{dx}[\sin x]$	$\dfrac{d}{dx}[\cos x]$	$\dfrac{d}{dx}[\ln x]$
$\dfrac{d}{dx}[e^x]$	$\dfrac{d}{dx}\left[\dfrac{1}{x}\right]$	$\dfrac{d}{dx}[\sqrt{x}]$

Analytical

$$f(x) = x^2 \cos(x)$$

$$f'(x) =$$

Numerical

x	-1	1
$k(x)$	-3	2
$k'(x)$	4	-5

$$h(x) = \frac{k(x)}{3x}$$

$$h'(-1) =$$

Derivative Rules: Level 1

Graphical

$y = g(x)$

$$p(x) = 5x \cdot g(x)$$

$$p'(3) =$$

Conceptual/Verbal

$$g(x) = e^x$$

$$f(x) = 3g(x) - x^2 + 3$$

$$f'(2) =$$