DATE: _____

3.3 Rules for Differentiation

MathKanection for Videos & Guided Notes

Product Rule

Given $f(x)$ and $g(x)$, where $f(x)$ and $g(x)$ are differentiable functions, then

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

See Khan's proof at: https://youtu.be/L5ErlC0COxI

Example 1: Given $h(x) = (3x + 4)(2x^2 + 5x - 1)$, find $h'(x)$.

Example 2: Given $g(x) = \left(\sqrt[4]{x} + 1\right)(4 - x^2)$, find $g'(x)$.

Example 3: Find the equation of the tangent line for $v(t) = (t^2 + 1)(4t^3 - 5)$ at $t = 1$

Example 4: Let $h(x) = a(x)w(x)$ and $q(x) = 3a(x) - 2w(x)$. Find $h'(1)$ and $q'(0)$.

x	$a(x)$	$a'(x)$	$w(x)$	$w'(x)$
0	3	-1	2	-7
1	4	-2	5	$\frac{1}{2}$

Example 5: Find $a''(0)$ where $a(x) = (4x^5 - 7x + 3)(x^2 - 4)$.