Derivative Rules

Thursday, September 23, 2010
4:08 PM

Constant	$y = k$	$y' = 0$
Power Rule	$y = x^n$	$y' = n x^{n-1}$
Product Rule	$y = f \cdot g$	$y' = f \cdot g' + g \cdot f'$
Quotient Rule	$y = f/g$	$y' = \frac{g \cdot f' - f \cdot g'}{g^2}$
Chain Rule	$y = f(g(x))$	$y' = f'(g(x)) \cdot g'(x)$

Trig. Fcns.	$y = \sin(x)$	$y' = \cos x$
	$y = \cos(x)$	$y' = -\sin x$
	$y = \tan(x)$	$y' = \sec^2 x$
	$y = \cot(x)$	$y' = -\csc^2 x$
	$y = \sec(x)$	$y' = \sec x \tan x$
	$y = \csc(x)$	$y' = -\csc x \cot x$

Examples

$y = \pi^2 \rightarrow y' = 0$ (not 2π)

$y = 5x^2 - 7x + 2 \quad y' = 10x - 7$

$y = 5x(x-3)$

$y' = 5x(1) + (x-3)5 = 10x - 15$

$y' = \frac{(x-3)5 - 5x(1)}{(x-3)^2}$

$y = 3(2x+7)^5$

$y' = 15(2x+7)^4 \cdot 2$

$y = \sqrt{\tan(3x+\pi)} = [\tan(3x+\pi)]^{\frac{1}{2}}$

$y' = \frac{1}{2}[\tan(3x+\pi)]^{-\frac{1}{2}} \cdot \sec^2(3x+\pi) \cdot 3$