MATH 900-3B: IMPORTANT FORMULAS

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1. Derivatives of Standard Functions

$$\begin{aligned} f'(x) &= \lim_{h\to 0} \frac{f(x+h)-f(x)}{h} \\ f(x) &= x^n, f'(x) = nx^{n-1},\ n\ rational \\ (\sin x)' &= \cos x,\ (\cos x)' = -\sin x \\ (e^x)' &= e^x, (b^x)' = (\log_e b)b^x \\ (\log_e x)' &= \frac{1}{x}, (\log_b x)' = \frac{1}{\log_e b}\frac{1}{x} \end{aligned}$$

2. Useful Rules

Sum Rule:	$h(x) = f(x) + g(x)$	$h'(x) = f'(x) + g'(x)$
Constant Rule:	$h(x) = af(x)$	$h'(x) = af'(x)$
Product Rule:	$h(x) = f(x)g(x)$	$h'(x) = f'(x)g(x) + f(x)g'(x)$
Quotient Rule:	$h(x) = \frac{f(x)}{g(x)}$	$h'(x) = \frac{f'(x)g(x)-f(x)g'(x)}{(g(x))^2}$
Chain Rule:	$h(x) = g(f(x))$	$h'(x) = g'(f(x)) \cdot f'(x)$
	$h(x) = (f(x))^n$	$h'(x) = n(f(x))^{n-1} \cdot f'(x)$
Multiple Rule:	$h(x) = f(ax)$	$h'(x) = af'(ax)$
Reciprocal Rule:	$h(x) = f(x)^{-1}$	$h'(x) = -f'(x)f(x)^{-2}$

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