

# The Chain Rule

## Chain Rule Variants

The chain rule applied to some specific functions.

1.  $\frac{d}{dx}([f(x)]^n) = n[f(x)]^{n-1} f'(x)$
2.  $\frac{d}{dx}(e^{f(x)}) = f'(x)e^{f(x)}$
3.  $\frac{d}{dx}(\ln[f(x)]) = \frac{f'(x)}{f(x)}$
4.  $\frac{d}{dx}(\sin[f(x)]) = f'(x)\cos[f(x)]$
5.  $\frac{d}{dx}(\cos[f(x)]) = -f'(x)\sin[f(x)]$
6.  $\frac{d}{dx}(\tan[f(x)]) = f'(x)\sec^2[f(x)]$
7.  $\frac{d}{dx}(\sec[f(x)]) = f'(x)\sec[f(x)]\tan[f(x)]$
8.  $\frac{d}{dx}(\tan^{-1}[f(x)]) = \frac{f'(x)}{1+[f(x)]^2}$