The Chain Rule

Chain Rule Variants

The chain rule applied to some specific functions.

1.
$$\frac{d}{dx} \left(\left[f(x) \right]^n \right) = n \left[f(x) \right]^{n-1} f'(x)$$

2.
$$\frac{d}{dx} \left(\mathbf{e}^{f(x)} \right) = f'(x) \, \mathbf{e}^{f(x)}$$

3.
$$\frac{d}{dx} \left(\ln \left[f(x) \right] \right) = \frac{f'(x)}{f(x)}$$

4.
$$\frac{d}{dx} \left(\sin \left[f(x) \right] \right) = f'(x) \cos \left[f(x) \right]$$

5.
$$\frac{d}{dx} \bigg(\cos \Big[f(x) \Big] \bigg) = -f'(x) \sin \Big[f(x) \Big]$$

6.
$$\frac{d}{dx}\bigg(\tan\Big[f(x)\Big]\bigg) = f'(x)\sec^2\Big[f(x)\Big]$$

7.
$$\frac{d}{dx}\bigg(\sec \Big[f(x)\Big] \bigg) = f'(x) \sec \Big[f(x)\Big] \tan \Big[f(x)\Big]$$

8.
$$\frac{d}{dx}\bigg(\tan^{-1}\Big[f(x)\Big]\bigg) = \frac{f'(x)}{1+\Big[f(x)\Big]^2}$$