Differentiation Rules

Constant Rule: $\frac{d}{dx}(c) = 0$

Constant Multiple Rule: $\frac{d}{dx}\left[cf(x)\right] = c\frac{d}{dx}f(x)$

Sum Rule: $\frac{d}{dx}\left[f(x) + g(x)\right] = \frac{d}{dx}f(x) + \frac{d}{dx}g(x)$

Difference Rule: $\frac{d}{dx}\left[f(x) - g(x)\right] = \frac{d}{dx}f(x) - \frac{d}{dx}g(x)$

Product Rule: $\frac{d}{dx}\left[f(x)g(x)\right] = f(x)\frac{d}{dx}g(x) + g(x)\frac{d}{dx}f(x)$

Quotient Rule: $\frac{d}{dx}\left[\frac{f(x)}{g(x)}\right] = \frac{g(x)\frac{d}{dx}f(x) - f(x)\frac{d}{dx}g(x)}{\left[g(x)\right]^2}$

Chain Rule: $\frac{d}{dx}\left[f\left(g(x)\right)\right] = f'\left(g(x)\right)\frac{d}{dx}g(x)$

Power Rule: $\frac{d}{dx}\left(x^n\right) = nx^{n-1}$

Power and Chain Rules: $\frac{d}{dx}\left[g(x)\right]^n = n\left[g(x)\right]^{n-1}g'(x)$