Basic differentiation rules:

(1) $\frac{d}{dx}(c) = 0$, where c is constant

(2) $\frac{d}{dx}(x^n) = nx^{n-1}$, if n is any real number

(3) $\frac{d}{dx}(cf(x)) = c\frac{df}{dx} = cf'(x)$, where c is constant

(4) $\frac{d}{dx}(f(x) \pm g(x)) = f'(x) \pm g'(x)$

(5) $\frac{d}{dx}(f(x)g(x)) = f'(x)g(x) + f(x)g'(x)$

(6) $\frac{d}{dx}\left(\frac{1}{f(x)}\right) = -\frac{f'(x)}{f^2(x)}$

(7) $\frac{d}{dx}\left(\frac{f(x)}{g(x)}\right) = \frac{f'(x)g(x) - f(x)g'(x)}{g^2(x)}$

(8) $\frac{d}{dx}(h(x)) = \frac{df}{dg} \cdot \frac{dg}{dx} = f'(g(x)) \cdot g'(x)$, where $h(x) = f(g(x))$