Attendance Check-in #7

- Exercise 1:

a) (Product rule) - If f & g are both differentiable at x, then fg is also differentiable at x.

$$(fg)'(x) = f'(x)g(x) + f(x)g'(x)$$

b) (Quotient rule) - If f & g are differentiable at x w/ $g(x) \neq 0$, then f/g is as well.

$$\left(\frac{f}{g}\right)'(x) = \frac{g(x)f'(x) - f(x)g'(x)}{[g(x)]^2}$$

- Exercise 2:

a) $h(x) = (x^7+3x)'(\ln x) + (x^7+3x)(\ln x)'$

$$\rightarrow h(x)' = (7x^6+3)\ln x + (x^7+3x)\left(\frac{1}{x}\right)$$

b) $h(x) = \frac{(x^2-1)}{(x^3+1)}$ $\quad h'(x) = \frac{(x^3+1)(x^2-1)' - (x^2-1)(x^3+1)}{(x^3+1)^2}$

$$\rightarrow h'(x) = \frac{(x^3+1)(2x) - (x^2-1)(3x^2)}{(x^3+1)^2}$$

- Exercise 3:

a) $f(x) = (5x^2-2x)^3$ $\quad (f \cdot g)'(x) = f'(g(x))g'(x)$

Inside: $5x^2-2x$ $\quad g'(x): 10x$

Outside: x^3 $\quad f'(x): 3x^2$

$$\rightarrow 3(5x^2-2x)^2(10x-2)$$