Math 1210 #10
Rules For Finding Derivatives

Constant Function Rule

Identity Function Rule

Constant Multiple Rule

Sum & Difference Rule

POWER RULE

n	$f(x) = x^n$	$f'(x)$	

EX 1

Find $f'(x)$ if $f(x) = 3x^7 - 4x^6 + x^5 + 2x^3 - x^2 + 4$

Product Rule

If f and g are differentiable, then

$$D_x\big(f(x)g(x)\big) = f(x)D_x[g(x)] + D_x[f(x)]g(x)$$

EX 2

Find $f'(x)$ if $f(x) = (2x^3 - 4x + 1)(3x + 5)$.

2a)

Use the product rule:

2b)

Multiply out and use the power rule to check:

Quotient Rule

Let f and g be differentiable functions, g(x) $\neq$ 0, then

$$D_x \frac{f(x)}{g(x)} = \frac{g(x)D_x[f(x)] - f(x)D_x[g(x)]}{g^2(x)}.$$

EX 3

Find f′(x) if $f(x) = \frac{2x^2+4x-1}{3x-2}$.

EX 4

$$y = \frac{-3}{x} + \frac{2}{x^4 - 7x}$$

Find $y'(x)$

Note: $D_x(x^{-n}) = -nx^{-n-1}$ for n, a positive integer

EX 5

Find $f'(x)$ if $f(x) = \frac{5x-4}{x^2+1}$

EX 6

Find $D_x(y)$ if $y = 3x(x^3 - 2x + 1)$

EX 7

Find $\frac{dy}{dx}$ if $y = \frac{-3}{x^5} + \frac{2}{x}$

$$\frac{g(x)f'(x) - f(x)g'(x)}{(g(x))^2}$$
$$= \frac{\text{lo} \cdot \text{ d hi} - \text{hi} \cdot \text{ d lo}}{\text{lo} \cdot \text{lo}}$$