Product Rule: If $y = f(x) \cdot g(x)$

- Then $y' = f(x) \cdot g'(x) + g(x) \cdot f'(x)$

  Or

  Mrs. Mac's Version $y' = (first) \cdot \frac{d}{dx}(second) + (second) \cdot \frac{d}{dx}(first)$

Product Rule	

- Sometimes you can do Algebra so you don't have to use product rule. Most times if you have a choice, the Algebra is the best way to go.

Example(s) Two: $f(x) = (3x^2 + 4)(2x - 6)$

A. Do some Algebra so you don't have to use product rule

B. Use Product Rule

Example(s) Three: $f(x) = 3xe^x$

You have no choice in this problem. You must use product rule.

Quotient Rule: If $y = \frac{f(x)}{g(x)}$

Quotient Rule	

■ Then $y' = \frac{g(x) \cdot f'(x) - f(x) \cdot g'(x)}{[g(x)]^2}$

Or

Mrs. Mac's Version $y' = \frac{lo\ d\ hi - hi\ d\ lo}{lo^2}$

Example(s) Four: $f(x) = \frac{5x^3 - 4x^2 + 3x - 2}{x}$

A. Do some Algebra so you don't have to use the quotient rule

B. Use Quotient Rule

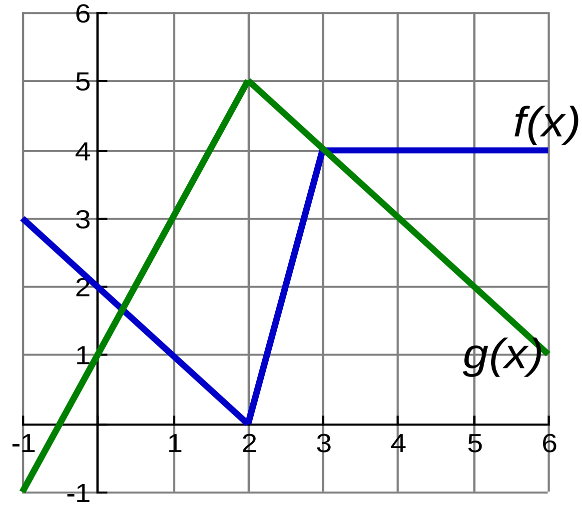
Example(s) Five: $f(x) = \frac{3x^2 + 4x}{x + 2}$

Example(s) Six: $f(x) = (x^2 - 4x)(x^{\frac{1}{2}} + 2)$

Example(s) Seven: $\left.\frac{d}{dx}\left[\frac{e^x}{x^2+1}\right]\right|_{x=0}$ *and* $\left.\frac{d}{dx}\left[\frac{e^x}{x^2+1}\right]\right|_{x=1}$

Example Eight: Find the tangent line to $f(x) = \frac{2x}{x-4}$ at $x = 6$

Example Nine: If f and g are the functions whose graphs are shown, let $m(x) = f(x)g(x)$ and $q(x) = \frac{f(x)}{q(x)}$.



A.)Find $m'(1)$

B.)Find $q'(0)$