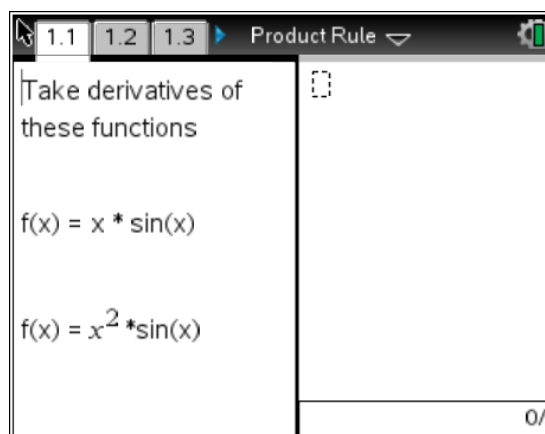# 3.3b Rules for Differentiation

Use Product Rule to discover the rule for taking derivatives of products of functions

Take derivatives of these functions

$f(x) = x * \sin(x)$

$f(x) = x^2 * \sin(x)$

$$\frac{d}{dx}(uv) = u\frac{dv}{dx} + v\frac{du}{dx}$$

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$$\frac{d}{dx}(x^2 + 1)(x^3 - 2)$$

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The Quotient Rule

$$\frac{d}{dx}\left(\frac{u}{v}\right) =$$

Differentiate: $y = \dfrac{x^2 + 1}{3x - 2}$

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Power rule for negative integer powers of x

Sep 6-7:38 PM

Find an equation for the line tangent to the curve

$$y = \frac{x^2 + 3}{2x} \qquad \text{at x=1}$$

ex #9

An orange farmer currently has 200 trees yielding an average of 15 bushels of oranges per tree. She is expanding her farm at the rate of 15 trees per year, while improved husbandry is improving her average annual yield by 1.2 bushels per tree. What is the current rate of increase of her total annual production of oranges?

Higher order derivatives

$$y'' = \frac{dy'}{dx} = \frac{d}{dx}\frac{dy}{dx} = \frac{d^2y}{dx^2}$$

$$y''' = \frac{dy''}{dx} = \frac{d}{dx}\frac{dy}{dx}\frac{dy}{dx} = \frac{d^3y}{dx^3}$$

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