

Warm Up:

What is the product rule?

$$\text{If } f(x) = u(x)v(x)$$

$$f'(x) = u(x)v'(x) + v(x)u'(x)$$

What is the Quotient rule?

$$\text{If } f(x) = \frac{u(x)}{v(x)}$$

$$f'(x) = \frac{v(x)u'(x) - u(x)v'(x)}{v^2(x)}$$

Jan 15-12:35 PM

$$f(x) = \tan(x)$$

$$= \frac{\sin(x)}{\cos(x)}$$

$$f'(x) = \frac{\cos(x)\cos(x) - \sin(x)(-\sin(x))}{\cos^2(x)}$$

$$f'(x) = \frac{\cos^2(x) + \sin^2(x)}{\cos^2(x)} = 1 + \tan^2(x)$$

$$f'(x) = \frac{1}{\cos^2(x)} = \left(\frac{1}{\cos(x)}\right)^2$$

$$f'(x) = \sec^2(x)$$

$$\frac{x+1}{1+\frac{1}{x}} = 1$$

Jan 15-12:35 PM

$$f(x) = \frac{1 + \ln x}{x}, \quad x \neq 0$$

$$f'(x) = \frac{(x) \left(\frac{1}{x}\right) - (1 + \ln x)(1)}{x^2}$$

$$f'(x) = \frac{1 - 1 - \ln x}{x^2}$$

$$f'(x) = \frac{-\ln x}{x^2}$$

Jan 15-12:35 PM

$$y = \frac{x + \sin x}{3}$$

$$y' = \frac{(3)(1 + \cos x) - (x + \sin x)(0)}{9}$$

$$y' = \frac{\cancel{3}(1 + \cos x)}{\cancel{9} \cancel{3}}$$

$$y' = \frac{1 + \cos x}{3}$$

Jan 15-12:35 PM

$$g(x) = \ln \left(\frac{x^2-1}{x^2+1} \right)$$

$$\left\{ \begin{array}{l} g(x) = \ln(\text{crap}) \\ g'(x) = \frac{1}{\text{crap}} \cdot (\text{crap})' \end{array} \right.$$

$$g'(x) = \left(\frac{x^2+1}{x^2-1} \right) \cdot \left(\frac{(x^2+1)(2x) - (x^2-1)(2x)}{(x^2+1)^2} \right)$$

$$g'(x) = \left(\frac{x^2+1}{x^2-1} \right) \left(\frac{(2x)(x^2+1 - x^2+1)}{(x^2+1)^2} \right)$$

$$g'(x) = \left(\frac{x^2+1}{x^2-1} \right) \left(\frac{(2x)(2)}{(x^2+1)^2} \right)$$

$$g'(x) = \frac{4x}{(x^2-1)(x^2+1)}$$

Jan 15-12:35 PM

HW p. 219 1-10

Exercise 7L

Find the derivative of each function in questions 1 to 10.

1 $f(x) = x^2(2x-3)^4$

2 $f(x) = x^2e^{-x}$

3 $f(x) = \frac{4}{x^2+3}$

4 $f(x) = \frac{x}{\sqrt{2x+1}}$

5 $f(x) = \sqrt{e^{2x} + e^{-2x}}$

6 $f(x) = \ln(1-2x^3)$

7 $f(x) = \ln(\ln x^2)$

8 $f(x) = \frac{2}{e^x + e^{-x}}$

9 $f(x) = \frac{1}{x^2-3x-2}$

10 $f(x) = x^4\sqrt{x^2+3}$

Jan 15-12:35 PM