

Goals: Chain Rule.

Hw: p. 133  
# 7-21 (due Fri)

$$\frac{d}{dx} (5-3x)^3$$

ex  $\frac{d}{dx} x^3$   
 $3x^2$

$$3(5-3x)^2 \cdot -3$$

der. of "outside"      der. of "inside"

$$-9(5-3x)^2$$

$$y = \sin(3x^2)$$

$$y' = \underline{\cos(3x^2)} \cdot 6x$$

$$y' = 6x \cos(3x^2)$$

$$\frac{d}{dx} \frac{2f}{\sin(3x)g} = \frac{0 - 2\cos(3x) \cdot 3}{\sin^2(3x)}$$

$$\frac{f'g - fg'}{g^2}$$

$$= \frac{-6\cos(3x)}{\sin^2(3x)}$$

$$= \frac{-6\cos 3x}{\sin 3x} \cdot \frac{1}{\sin 3x}$$

$$= -6\cot(3x) \csc(3x)$$

$$f(x) = \sqrt[4]{5-7x^2} = (5-7x^2)^{1/4} \left\{ \begin{array}{l} \frac{d}{dx} x^{1/4} \\ \frac{1}{4} x^{-3/4} \end{array} \right.$$

$$f'(x) = \frac{1}{4} (5-7x^2)^{-3/4} \cdot -14x$$

$$\frac{d}{dx} 5-7x^2 = -7(2x)$$

$$\frac{-14x}{4} \cdot (5-7x^2)^{-3/4}$$

$$\frac{-14x}{4(5-7x^2)^{3/4}}$$

$$= \frac{-14x}{4 \sqrt[4]{(5-7x^2)^3}}$$

# CHAIN RULE

$$\frac{d}{dx} f(g(x)) = f'(g(x)) \cdot g'(x)$$

Derivative of the  $x$  deriv. of  
outside the inside.