

Calculus AB

2-4

Chain Rule

(with Trig)

Nov 7-10:33 AM

Find the derivative of the function. (pg 134)

$$47) \cos(3x)$$

$$-\sin(3x)(3)$$

$$-3\sin(3x)$$

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$$53) h(x) = \sin(2x) \cos(2x)$$

$$h'(x) = \cos(2x)(2) \cdot \cos(2x) + \sin(2x) [-\sin(2x)(2)]$$

$$2\cos^2(2x) - 2\sin^2(2x)$$

$$2[\cos^2(2x) - \sin^2(2x)]$$

$$\cos 2x = \cos^2 x - \sin^2 x$$

$$2\cos 2(2x)$$

$$\boxed{2\cos 4x}$$

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$$55) f(x) = \frac{\cot x}{\sin x} = \frac{\cos x}{\sin x} \cdot \frac{1}{\sin x} = \frac{\cos x}{\sin^2 x}$$

$$f'(x) = \frac{-\sin x \cdot \sin^2 x - \cos x \cdot 2\sin x \cos x}{\sin^4 x}$$

$$= \frac{-\sin^3 x - 2\sin x \cos^2 x}{\sin^4 x} = \frac{-\sin^2 x - 2\cos^2 x}{\sin^3 x}$$

- optional -

$$= -\frac{1}{\sin x} - \frac{2\cos^2 x}{\sin^2 x \sin x} = \frac{-(-2\cot^2 x)}{\sin x}$$

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$$59) f(\theta) = \frac{1}{4} \sin^2(2\theta)$$

$$\begin{aligned} F(\theta) &= \frac{1}{4} \sin^2(2\theta) \\ &= \frac{1}{2} \sin(2\theta) \cos(2\theta) \cdot 2 \\ &= \sin(2\theta) \cos(2\theta) \end{aligned}$$

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Evaluate the derivative of the function at the indicated point.

$$73) y = 37 - \sec^3(2x), \quad (0, 36)$$

$$\frac{dy}{dx} = 0 - 3 \sec^2(2x) \sec(2x) \tan(2x) \cdot 2$$

$$= -6 \sec^3(2x) \tan(2x) \Big|_{0, 36}$$

$$= -6 \sec^3(0) \tan(0)$$

$$= -6(1)(0)$$

$$= 0$$

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Find the second derivative of the function.

$$81) f(x) = \sin(x^2)$$

$$F'(x) = 2x \cos x^2$$

$$\begin{aligned} F''(x) &= 2 \cos x^2 + 2x [-\sin x^2 (2x)] \\ &= 2 [\cos x^2 - 2x^2 \sin x^2] \end{aligned}$$

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Assignment:

Pg. 134
48 - 82 even

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