

MATH 1850 Sec 001
SINGLE VARIABLE CALCULUS I

QUIZ 5

February 21, 2013

Name (Last, First) Key

1. Find the derivative of the following function.

$$\begin{aligned} f(x) &= \cos\left(\frac{x}{\sqrt{x+4}}\right) \\ f'(x) &= -\sin\left(\frac{x}{\sqrt{x+4}}\right) \cdot \frac{d}{dx}\left(\frac{x}{\sqrt{x+4}}\right) \\ &= -\sin\left(\frac{x}{\sqrt{x+4}}\right) \cdot \frac{\sqrt{x+4} \cdot 1 - x \frac{d}{dx}(\sqrt{x+4})}{\sqrt{x+4}^2} \\ &= -\sin\left(\frac{x}{\sqrt{x+4}}\right) \cdot \frac{\sqrt{x+4} - \frac{x}{2\sqrt{x+4}}}{x+4} \\ &= \boxed{-\sin\left(\frac{x}{\sqrt{x+4}}\right) \cdot \left(\frac{x+8}{2(x+4)^{3/2}}\right)} \end{aligned}$$

2. Find the slope of the given curve at the given point.

$$\begin{aligned} 7y^3 + 3x^4 &= 2y + 8x \text{ at } (1, 1) \\ 21y^2 \frac{dy}{dx} + 12x^3 &= 2 \frac{dy}{dx} + 8 \\ (21y^2 - 2) \frac{dy}{dx} &= 8 - 12x^3 \\ \frac{dy}{dx} &= \frac{8 - 12x^3}{21y^2 - 2} \\ \frac{dy}{dx} \Big|_{(1,1)} &= \frac{8 - 12}{21 - 2} = \boxed{\frac{-4}{19}} \end{aligned}$$