

MATH 1850 Sec 001  
SINGLE VARIABLE CALCULUS I

QUIZ 7  
March 21, 2013

Name (Last, First) Key

1. If  $x^2 + y^2 = 25$  and  $dx/dt = -2$ , then what is  $dy/dt$  when  $x = 3$  and  $y = -4$ ?

$$\begin{aligned}2x \frac{dx}{dt} + 2y \frac{dy}{dt} &= 0 \\2 \cdot 3 \cdot (-2) + 2(-4) \frac{dy}{dt} &= 0 \\-12 - 8 \frac{dy}{dt} &= 0 \\\frac{dy}{dt} &= -\frac{12}{8} = \boxed{-\frac{3}{2}}\end{aligned}$$

2. Find the linearization  $L(x)$  of  $f(x)$  at  $x = a$ .

$$f(x) = x^3 - 2x + 3, \quad a = 2$$

$$\begin{aligned}f'(x) &= 3x^2 - 2 \\L(x) &= f(2) + f'(2)(x-2) \\&= 7 + 10(x-2) \\&= \boxed{10x - 13}\end{aligned}$$

$$\begin{aligned}f(2) &= 2^3 - 2 \cdot 2 + 3 \\&= 8 - 4 + 3 = 7 \\f'(2) &= 3 \cdot 2^2 - 2 \\&= 10\end{aligned}$$