

Quiz #05 – MATH 2421
Spring 2008

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Name : _____

Directions: YOU MAY USE A CALCULATOR FOR THIS QUIZ. No books or notes. Show algebra. Be sure to highlight your final answer!

1. Suppose we have the following:

$$z = f(x, y) = \frac{y}{x^2}$$

- (a) [1 *pt.*] Evaluate $f(2, 20)$.

- (b) [2 *pts.*] Evaluate the total differential

$$dz = f_x dx + f_y dy.$$

- (c) [1 *pts.*] Estimate the value of Δz using dz when x moves from 2.00 to 2.04 AND y moves from 20.00 to 19.98.

(#2) [2 pts.] Suppose $w = f(x, y)$ and both x and y depend on s and t :

$$x = x(s, t)$$

$$y = y(s, t)$$

Also, suppose s and t depend on θ :

$$s = s(\theta)$$

$$t = t(\theta)$$

Thus, after substituting, w ultimately depends on θ .

Write down the Multivariable Chain Rule for $\frac{\partial w}{\partial \theta}$. [Hint: Sum of products.]

(#3) [4 pts.] The Implicit Derivative formula for the 3-variable surface $F(x, y, z) = 0$ is

$$\frac{\partial y}{\partial x} = - \left(\frac{F_x}{F_y} \right).$$

If we have the surface $xy + x^2 \sin(zy) = 2$, then evaluate

$$\frac{\partial z}{\partial y} \text{ when } x = 1, y = 2, \text{ and } z = \pi.$$