

Name \_\_\_\_\_

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After adding previous sample then do

Math. 2673

sample Exam II

1. If  $u = x^y$ , show that

$$\frac{x}{y} \frac{\partial u}{\partial x} + \frac{1}{\ln x} \frac{\partial u}{\partial y} = 2u$$

2. If  $z = \cos(xy) + y \cos(x)$ , where  $x = u^2 + v$  and  $y = u - v^2$ , use the

Chain Rule to find  $\frac{\partial z}{\partial u}$  and  $\frac{\partial^2 z}{\partial u^2}$

- 3.) If  $z = \ln(x^2 + y^2)$ , find

$$\frac{\partial z}{\partial u} \text{ and } \frac{\partial z}{\partial v} \text{ where } x = e^u \cos(v) \text{ and } y = e^u \sin(v).$$

Eliminate all u's and v's

- 4.) If  $w = x^2 + y^2 + z^2$  where  $x = \cos(t)$ ,  $y = \sin(t)$  and  $z = t^2$ , use the

Chain Rule to find  $\frac{dw}{dt}$ .

Eliminate all x's y's and z's.

- 5.) Let  $U = U(x, y)$  Assume  $z = x + y$  and  $w = x - y$ .

$$\text{Then } x = \frac{(z + w)}{2} \text{ and } y = \frac{(z - w)}{2}$$

Prove that  $U_{xx} + U_{yy} = 2(U_{zz} + U_{ww})$