NAME: (print!) _Angelica Armstrong_ Section: _23_

E-MAIL SCANNED .pdf OF COMPLETED QUIZ to DrZcalc3@gmail.com (Attach-ment: q9FirstLast.pdf) ASAP BUT NO LATER THAN Oct. 5, 8:00pm

1. Find $\frac{\partial f}{\partial r}$ and $\frac{\partial f}{\partial s}$ as **functions of** r **and** s , if

$$f(x, y) = x^2 + 2xy^2 + 2y^3 \quad ,$$

and the variables are related by $x = r + 2s$ and $y = 3r + 2s$. You do not need to simplify!

$df/dx = 2x + 2y^2 \quad df/dy = 4xy + 6y^2 \quad dx/dr = 1 \quad dy/dr = 3$
$$dx/ds = 2 \quad dy/ds = 2$$

$$\frac{df}{dr} = (2x + 2y^2) \cdot 1 + (4xy + 6y^2) \cdot 3$$

$$\frac{df}{ds} = (2x + 2y^2) \cdot 2 + (4xy + 6y^2) \cdot 2$$

2. Find $\frac{\partial z}{\partial x}$ and $\frac{\partial z}{\partial y}$ if
$$x^2 + y^2 + z^2 = 5xyz + 1 \quad .$$
$$x^2 + y^2 + z^2 - 5xyz - 1 = 0$$

$dz/dx: \quad 2x - 5(x(dz/dx \cdot y) + yz) + 2z \, dz/dx \rightarrow -2x + 5yz = -5 \, xy\frac{dz}{dx} + 2z\frac{dz}{dx}$

$dz/dy: \quad 2y - 5(y(x \, dz/dy) + xz) + 2z \, dz/dy \rightarrow -2y + 5xz = -5yx\frac{dz}{dy} + 2z\frac{dz}{dy}$

$$\frac{dz}{dx} = \frac{-2x + 5yz}{-5xy + 2z} \qquad \frac{dz}{dy} = \frac{-2y + 5xz}{-5yx + 2z}$$