NAME: (print!) _____Aayushi Kasera_____ **Section:** _____

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!

$$\frac{df}{dr} = \frac{df}{dx}\frac{dx}{dr} + \frac{df}{dy}\frac{dy}{dr}$$

$$\frac{df}{dx} = 2x + 2y^2$$

$$\frac{df}{dy} = 4xy + 6y^2$$

$$\frac{dx}{dr} = 1 \qquad \frac{dy}{dr} = 3$$

$$\frac{dx}{ds} = 2 \qquad \frac{dy}{ds} = 2$$

$$\frac{df}{dr} = 2x + 2y^2 + 12xy + 18xy$$

$$\frac{df}{ds} = 4x + 4y^2 + 8xy + 12y^2$$

2. Find $\frac{\partial z}{\partial x}$ and $\frac{\partial z}{\partial y}$ if

$$x^2 + y^2 + z^2 = 5xyz + 1 \quad .$$

$$\frac{dz}{dx} = \qquad 2x + 0 + 2zz' = 5xyz' + 5yz$$

$$2x - 5yz = (5xy - 2z)z'$$

$$\therefore \; \frac{dz}{dx} = \frac{2x - 5yz}{5xy - 2z}$$

$$\frac{dz}{dy}$$

$$0 + 2y + 2zz' = 5xyz' + 5xz$$

$$\frac{2y - 5xz}{5xy - 2z} = z'$$