

"QUIZ" for Lecture 9

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E-MAIL SCANNED .pdf OF COMPLETED QUIZ to DrZcalc3@gmail.com (Attachment: 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

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

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

$$\frac{\partial f}{\partial r} = \frac{\partial f}{\partial x} \frac{\partial x}{\partial r} + \frac{\partial f}{\partial y} \frac{\partial y}{\partial r} \quad \frac{\partial f}{\partial s} = (2x + 2y^2)(2) + (4xy + 6y^2)(2)$$

$$= 4x + 4y^2 + 8xy + 12y^2$$

$$\frac{\partial f}{\partial s} = \frac{\partial f}{\partial x} \frac{\partial x}{\partial s} + \frac{\partial f}{\partial y} \frac{\partial y}{\partial s}$$

$$\frac{\partial f}{\partial r} = (2x + 2y^2)(1) + (4xy + 6y^2)(3)$$

$$= 2x + 2y^2 + 12xy + 18y^2$$

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

$$x^2 + y^2 + z^2 = 5xyz + 1$$

$$\frac{\partial x}{\partial x} = 1 \quad \frac{\partial y}{\partial x} = 0$$

$$\frac{\partial z}{\partial x} = 2x + 2z \frac{\partial z}{\partial x} = 5yz + 5xy \frac{\partial z}{\partial x}$$

$$\frac{\partial z}{\partial x} = \frac{2x - 5yz}{5xy - 2z}$$

$$\frac{\partial z}{\partial y} = 2y + 2z \frac{\partial z}{\partial y} = 5xz + 5xy \frac{\partial z}{\partial x}$$

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