

"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

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

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

$$\frac{\partial f}{\partial r} = \frac{\partial f}{\partial x} \cdot \frac{\partial x}{\partial r} + \frac{\partial f}{\partial y} \cdot \frac{\partial y}{\partial r}$$

$$\frac{\partial f}{\partial x} = 2x + 2y^2$$

$$\frac{\partial f}{\partial y} = 4xy + 6y^2$$

$$\frac{\partial x}{\partial r} = 1 \quad \frac{\partial y}{\partial r} = 3$$

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

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

$$\frac{\partial f}{\partial x} = 2x + 2y^2$$

$$\frac{\partial f}{\partial y} = 4xy + 6y^2$$

$$\frac{\partial x}{\partial s} = 2 \quad \frac{\partial y}{\partial s} = 2$$

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

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

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

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

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