

**“QUIZ” for Lecture 9**

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**Section:** 24

**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!

$$\frac{\partial f}{\partial r} = \frac{\partial f}{\partial x} * \frac{\partial x}{\partial r} + \frac{\partial f}{\partial y} * \frac{\partial y}{\partial r} = 2(r + 2s) + 2(3r + 2s)^2 + 12(r + 2s)(3r + 2s) + 18(3r + 2s)^2$$

$$\frac{\partial f}{\partial s} = \frac{\partial f}{\partial x} * \frac{\partial x}{\partial s} + \frac{\partial f}{\partial y} * \frac{\partial y}{\partial s} = 4(r + 2s) + 4(3r + 2s)^2 + 8(r + 2s)(3r + 2s) + 12(3r + 2s)^2.$$

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

$2x + 2z * \frac{\partial z}{\partial x} = 5 \left( yz + xy \frac{\partial z}{\partial x} \right)$ $\frac{\partial z}{\partial x} = \frac{5yz - 2x}{2z - 5xy}$	$2y + 2z \frac{\partial z}{\partial y} = 5 \left( xz + xy \frac{\partial z}{\partial y} \right)$ $\frac{\partial z}{\partial y} = \frac{5xz - 2y}{2z - 5xy}$
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