

Math 5B - Weekly quiz V
04/29/2010

NAME: _____

Grade: / 3

Suppose f is a differentiable function of x and y , and $g(u, v) = f(\ln u + v^2, e^{v-2u} + 2uv)$. Use the table of values to calculate ~~$f(1, 2)$~~ $g_u(1, 2)$ and $g_v(1, 2)$

	f	g	f_x	f_y
(1, 2)	7	5	-1	4
(4, 5)	5	7	8	-2

$$x(u, v) = \ln u + v^2$$

$$y(u, v) = e^{v-2u} + 2uv$$

$$x_u = \frac{1}{u}$$

$$y_u = -2e^{v-2u} + 2v$$

$$x_v = 2v$$

$$y_v = e^{v-2u} + 2u$$

$$x(1, 2) = 4$$

$$y(1, 2) = 5$$

$$\frac{\partial g}{\partial u}(1, 2) = \frac{\partial f}{\partial x}(4, 5) \cdot \frac{\partial x}{\partial u}(1, 2) + \frac{\partial f}{\partial y}(4, 5) \cdot \frac{\partial y}{\partial u}(1, 2)$$

$$= (8) \cdot (1) + (-2) \cdot (5) = -2$$

$$\frac{\partial g}{\partial v}(1, 2) = \frac{\partial f}{\partial x}(4, 5) \cdot \frac{\partial x}{\partial v}(1, 2) + \frac{\partial f}{\partial y}(4, 5) \cdot \frac{\partial y}{\partial v}(1, 2)$$

$$= (8) \cdot (4) + (-2) \cdot (3) = 26$$

So $g_u(1, 2) = -2$ and $g_v(1, 2) = 26$