

SOLUTION KEY

Section: 163

Name & Surname: _____

Math 120 Spring 2017-2018

Quiz no.: 03

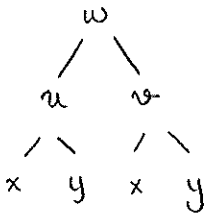
ID Number: _____

Date: 13.04.18

Time Limit: ~15 Minutes

Grade: _____

1. Assuming that f and g are differentiable functions, find $\frac{\partial w}{\partial x}$ if $w = f(u, v)$, $u = xf(x, y)$, and $v = f(x, y)g(x, y)$.



The first partial derivative of w ;

$$\frac{\partial w}{\partial x} = \frac{\partial f(u, v)}{\partial u} \cdot \frac{\partial u}{\partial x} + \frac{\partial f(u, v)}{\partial v} \cdot \frac{\partial v}{\partial x}$$

$$= f_u(u, v) \cdot \left[\frac{\partial}{\partial x} (x \cdot f(x, y)) \right] + f_v(u, v) \left[\frac{\partial}{\partial x} (f(x, y) \cdot g(x, y)) \right]$$

$$= f_u(u, v) \left[f(x, y) + x \cdot \frac{\partial f(x, y)}{\partial x} \right] + f_v(u, v) \left[\frac{\partial f(x, y)}{\partial x} \cdot g(x, y) + f(x, y) \cdot \frac{\partial g(x, y)}{\partial x} \right]$$

$$= f_u(u, v) [f(x, y) + x \cdot f_x(x, y)] + f_v(u, v) [f_x(x, y)g(x, y) + f(x, y) \cdot g_x(x, y)]$$