

Math 210 (Lesieutre)

12.4/12.5: Partial derivatives and the chain rule

February 8, 2017

Problem 1. Compute the indicated partial derivatives:

a) $\frac{\partial}{\partial x} (x^2y)$

b) $\frac{\partial}{\partial y} (x^2y)$

c) f_y , where $f(x, y, z) = e^{xyz}$

d) g_y , where $g(x, y) = y \cos x$

Problem 2. Consider the function $f(x, y) = x \cos(xy)$. Compute the four second partial derivatives.

Problem 3. Suppose that $f(x, y) = x^2 + y^2$, and that $x(t) = 2t$, $y(t) = \sin t$. What is $\frac{df}{dt}$?

Problem 4. Suppose that $f(x, y) = xy^2$, and $x(s, t) = 2s + t$ and $y(s, t) = s \cos t$. Compute the partial derivative $\frac{\partial f}{\partial s}$.

Problem 5. Consider the ellipse defined by $F(x, y) = 0$, where $F(x, y) = x^2 + xy + y^2 - 1$. Compute $\frac{dy}{dx}$.