

Math 16C  
Kouba  
Worksheet 4

1.) Find  $z_x$  and  $z_y$  for each of the following functions.

a.)  $f(x, y) = \sin 3x + \cos 5y$

b.)  $f(x, y) = \cos(x^2y)$

c.)  $f(x, y) = \ln(\sec x - \tan y)$

d.)  $f(x, y) = e^{x^2 \sin y}$

e.)  $f(x, y) = \frac{\ln y}{\ln x + \ln y}$

f.)  $f(x, y) = \cot^2(4y) - \csc^3(5xy)$

g.)  $f(x, y) = \sqrt{7y^2 + 6 \cot(11 - \pi e^{(-1/2)\sqrt{y}})}$

h.)  $f(x, y) = \ln\{\ln\{\ln(3x - 9y^2)\}\}$

2.) Find  $z_x, z_y, z_{xx}, z_{yy},$  and  $z_{xy}$  for  $f(x, y) = \sin(xy)$ .

3.) Let  $f(x, y) = (y + 7x)^2$ . Show that  $z_{xx} = 49 \cdot z_{yy}$ .

4.) Find a function  $z = f(x, y)$  so that

$$z_x = y^3 - 2x + 5 \quad \text{and} \quad z_y = 2ye^{y^2} + 3xy^2.$$