

ESP Quiz 3 (Kouba)

Please PRINT your name here : .....

This quiz is due next Tuesday at the beginning of ESP class.

1.) (15 pts.) Find and classify the critical points for  $z = 4xy - x^4 - y^4$ .

2.) (15 pts.) Show that  $z = \ln(1 + x^2 + y^2)$  satisfies the equation  $z_{xy} + z_x z_y = 0$ .

3.) (15 pts.) Determine a function  $z$  whose partial derivatives are  $z_x = e^{y^2} - y \sin(xy) + 3x^2$  and  $z_y = 2xye^{y^2} - x \sin(xy) + \sec^2 y$ , or conclude that this is impossible.

4.) (15 pts.) Find the point  $(x, y, z)$  on the plane  $x + 2y + 3z = 6$  which is nearest the origin.