

Economics 205, Fall 2008: Quiz 3

1. Find all the critical points of the following functions and determine which are local maxima, local minima, or neither.
  - (a)  $x^2 + 6xy + y^2 + 4x - 8y + 12$ .
  - (b)  $y^2 - xy - x^2 + 4y$ .
2. Solve:  $\max e^{-(x^2+2y^2)}$  subject to  $3x + 2y = 4$ .
3. Consider the equations:  $yz = 12$ ,  $xz = 2$ , and  $x + y + z = w$ .
  - (a) Is it possible to solve these equations for  $x$ ,  $y$ , and  $z$  in terms of  $w$  near the point  $(x_0, y_0, z_0, w_0) = (1, 6, 2, 9)$ ?
  - (b) If you answered yes to part a, then compute the derivatives of the implicit functions evaluated at  $(x_0, y_0, z_0, w_0)$ .
  - (c) If you answered no to part a, then find a point at which it is possible to solve the equations for  $x$ ,  $y$ , and  $z$  in terms of  $w$ .