

1. Problem 1.
2. Investigate the stationary points of the following functions, deciding in each case whether the point is a maximum or a minimum.
  - (a)  $f(x, y) = 3x^2 + 2xy + y^2$
  - (b)  $f(x, y) = xy$
  - (c)  $f(x, y) = x^2 - y + e^y$
  - (d)  $f(x, y) = e^{-(x^2+y^2-xy)}$
  - (e)  $f(x, y) = \frac{1}{x} + \frac{1}{y} + xy$
  - (f)  $f(x, y) = 4x^2 + 2xy - 5y^2 + 2$