Further mathematics for economists

Exercise Sheet 9 - Functions of several variables II

1. Given the equation $F(x, y) = 0$ shown below, find dy/dz by the implicit-function rule for

   (a) $x^3 - 2x^2y + 3xy^2 - 22 = 0$

   (b) $2x^2 + 4xy - y^4 + 67 = 0$

2. Consider the functions $f(x, y, z) = xy^\alpha z$ and $g(x, y, z) = x^\beta e^{yz}$. For the particular case in which both functions are constant compute dx/dy and dz/dy.

   Hints:

   - Remember what happens to the derivatives/differentials of constant functions
   - Apply the methods for implict relations

3. The function
   $$f(x, y) = 1 - y^3 - 3yx^2 - 3y^2 - 3x^2$$
   has four stationary points. Locate and classify these points.