1. p. 191, problems 2, 8 (a), 9.

2. Let \( f(x, y, z) = x + y^2 + z^3 + xy \).
   
   (a) Find the first order Taylor polynomial at the point \((0,0,0)\).
   
   (b) Find the second order Taylor polynomial at the point \((0,0,0)\).
   
   (c) Guess the second order Taylor polynomial of \( f(x, y, z) = x^3 + 2y + z^3 + yz \) at the point \((0,0,0)\).

3. Let \( f(x, y) = xe^{x+y-1} \).
   
   (a) Find the first order Taylor polynomial at the point \((1,0)\). Use this to give an estimate for \( f(1.1,0.1) \).
   
   (b) Find the second order Taylor polynomial at the point \((1,0)\). Use this to give an estimate for \( f(1.1,0.1) \).
   
   (c) Calculate \( f(1.1,0.1) \) with a calculator, compare with the previous estimates.

4. p. 222, problems 5, 7

5. Let \( f(x, y) = \sin(x^2 + y^2) \).
   
   (a) Compute the second order Taylor polynomial \( T_2 \) at the point \((0,0)\).
   
   (b) Show that \((0,0)\) is a critical point for \( f \) and \( T_2 \).
   
   (c) Show that \( f \) and \( T_2 \) have the same discriminant at \((0,0)\).
   
   (d) Show that \( f \) and \( T_2 \) a local minimum at \((0,0)\).

6. p. 224, problems 33, 34. Do NOT use Lagrange multipliers, but use the method of Section 3.3 instead, to find the maximum and minimum on the boundary.

7. Why does \( f(x, y) = x^4 + y^4 \) have a local minimum at \((0,0)\)?