Math 260

Problem Set 9. Due on Wed. April 7

1. Find the extreme values of the function \( f(x, y) = x^2 + y^2 \) along the line \( y = x + 1 \).

2. Find the extreme values of the function \( f(x, y) = x^2 - y^2 \) along the circle \( x^2 + y^2 = c^2 \).

3. For each of the following functions: find the extreme values, find the max and min (if they exist), then write the quadratic Taylor expansion at the point \((0, 0)\):
   a) \( f(x, y) = e^x + e^y \);
   b) \( f(x, y) = e^x e^y \);
   c) \( f(x, y) = \frac{1}{x^2 + y^2 + 1} \).

EXTRA CREDIT: In 3, find a bound for the error term in the quadratic expansions.