14.7 Problem Set
Dr. Holmes
March 15, 2006

corrected version: removed mad comment from problem 3...
Recommended problems from book: 5-17 odd, 27,29, 37-40, 45-49.

1. Find all critical points of
\[ f(x, y) = x^3 + y^3 + 3x^2 - 18y^2 + 81y + 5 \]
and classify them as local maxima, local minima, or saddle points.

2. Find all critical points of
\[ \frac{9x}{x^2 + y^2 + 1} \]
and classify them as local maxima, local minima, or saddle points. (this
is an exercise in taking partial derivatives carefully).

3. Find the absolute maximum and minimum of
\[ f(x, y) = 2x^2 - y^2 \]
on the disk
\[ x^2 + y^2 \leq 1 \]
(removed entirely insane comment about integrals; you don’t need to
integrate, but to differentiate and solve a trig equation).