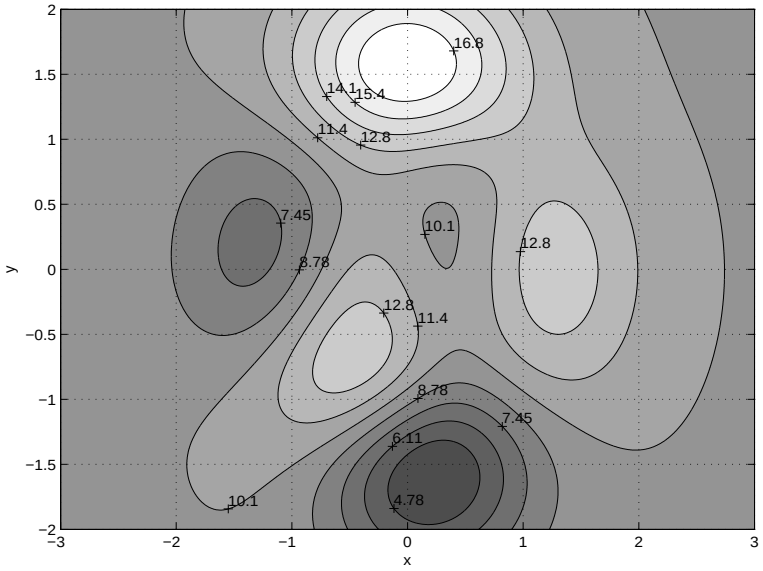
MA205 - Integral Calculus
Homework 3: Due in class Friday, October 5, 2007

Instructions: Complete all of the following problems by hand, showing all work, in order to receive full credit. (Use Mathematica only as a tool to check your work!)

1. Using the contour plot below, estimate $\int\int_R f(x,y)\,dA$ by

   (a) using the upper right corners as sample points with 6 subregions.

   (b) using the midpoints as sample points with 6 subregions.



2. Suppose the function above represents the temperature in a region. If you divide your answer from the previous problem by the area of the region, what physical quantity would that represent?

3. Evaluate $\displaystyle\int_1^3 \int_0^2 4xy + 5\,dx\,dy$.

4. Evaluate $\displaystyle\int_0^{\pi/2} \int_0^1 y\cos(xy)dx\,dy$.

5. For each of the following:

   (a) Draw and label the region of integration.

   (b) Describe the region in terms of inequalities.

   (c) Switch the order of integration.

   (d) Evaluate the integral.

   (a) $\displaystyle\int_0^1 \int_{x^2}^1 2x + 3y\,dy\,dx$

   (b) $\displaystyle\int_0^1 \int_y^1 x + y\,dx\,dy$