Math 163A A06 **Fall 2007** **Guide for the Final Exam**

The final exam is Tuesday 20 November, at 2:30pm, in our classroom. This is also the final deadline for any late good problems.

The exam is cumulative, but there will not be any questions specifically from Chapters 1 and 2, which were the subject of test 1. The other tests and their study guides give good sample questions for the sections they covered.

Here are some sample questions from the sections that were not covered by the other tests.

1. Find the absolute maximum and minimum of the function $f(x) = 2x^3 - 3x^2 - 12x + 5$ on the interval $[-2, 0]$.

2. A company wishes to manufacture a box with a volume of 6 m^3 that is open on top and has a square base. The material for the bottom of the box costs \$3 per m^2, while the material for the sides costs \$2 per m^2. Find the dimensions of the box that will lead to minimum total cost. What is the minimum total cost?

3. Graph and label the level curves at $z = -1$, $z = 1$, and $z = 2$ for the equation $zx^2 - y = 0$.

4. Let $f(x, y) = x(y^2 + 3)^5 + \dfrac{1}{y} + 2x^6 - 9$. Compute:

   (a) $f_x(x, y) =$

   (b) $f_y(x, y) =$

   (c) $f_{xx}(x, y) =$

   (d) $f_{xy}(x, y) =$

5. Let $f(x, y) = x^2 + xy + y^2 - 6x$. Find all extrema of f and identify any saddle points.