

Math 163A**Guide for Test 4**

Here are some sample questions from old tests. Some topics that we covered are not represented by these questions, but are still fair game.

1. 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?
2. Find the absolute maximum and minimum of the function $f(x) = 2x^3 - 3x^2 - 12x + 5$ on the interval $[-2, 0]$.
3. Graph and label the level curves at $z = -1$, $z = 1$, and $z = 2$ for the equation $zx^2 - y = 0$.
4. Let $f(x, y) = x(y^2 + 3)^5 + \frac{1}{y} + 2x^6 - 9$. Compute:
 - (a) $f_x(x, y) =$
 - (b) $f_y(x, y) =$
 - (c) $f_{xx}(x, y) =$
 - (d) $f_{xy}(x, y) =$