In view of the Thanksgiving break, we will not follow the usual format for lab this week. There are a few optimization problems for you to work on, but they will not be collected or graded. In addition to the new problems given here, you can work on the homework problems.

- 1. A cardboard box will have a square bottom and an open top. If the area of the sides and bottom is to be 12 square feet, what is the largest possible volume for the box?
- **2.** A cardboard box will have a square bottom and an open top. If the volume of the box is to be 4 cubic feet, what is the smallest possible area (for the sides and bottom)?
- **3.** An athletic field is to be built. Its shape will be a rectangle with a semicircle on each end. A track around the perimeter of the field must have a length of 440 meters. What is the largest possible area for the rectangular portion of the field? What is the largest possible total area for the field, including the area of the rectangle and the areas of the two semicircles?



4. In class, we looked at finding the maximum value of xy^2 subject to the constraint that x and y are positive numbers and x+y=1. What happens more generally, if you look for the maximum value of x^ny^m , where n and m are positive integers, subject to the same constraint? Solve the problem for n and m in general, and see whether there is any interesting pattern in the answer.

If you need more work to do, you can work on the practice problems and/or homework from Section 4.4.