# Take-Home Quiz 8

Math 131 Section 22

"Due" Friday, December 2, 2005

This is the final quiz—and rather than having it due during Reading Period—which may be forbidden!—this quiz is entirely **optional**. You will receive the full 12 points regardless of whether you do the quiz or not—but if you do hand it in, I will comment on your solutions, which might be helpful practice for the final.

Problem 1. (4 points).   You work for a soup company, and you have been given 8π cubic inches of soup. Minimize the surface area of a cylindrical can holding this volume of soup.

Problem 2. (4 points).   Imagine we live in a world where sheep prefer hexagonal fences (it may even be this world; I'm not sure if any animals have polygonal preferences). You have been given 1200 feet of fence, which you can divide into four pieces of length x and two pieces of length y, and then attach at 120 degree angles as shown:
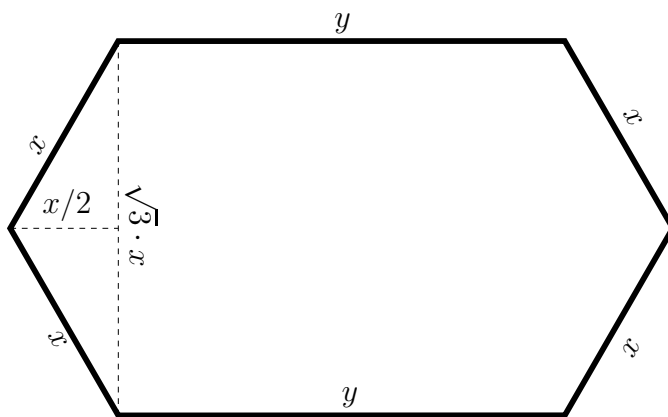
What lengths x and y should you choose to maximize the area enclosed by the hexagon? I have made some measurements of the dashed lines (using properties of 30–60–90 triangles) which might help you in your calculation.

Problem 3. (4 points). You are in a canoe (a $k\nu$?), one mile from shore, trying to get to Q, your home, as **quickly** as possible. Let P be the point nearest you on the shore; the distance between P and your home Q is ten miles.

Your plan is to paddle in a straight line (following the dashed line) to some point R on the shore, and then walk the rest of the way. You can paddle 3 miles per hour, and you can walk 4 miles per hour. Describe the best place R to land your canoe by reporting the distance x between P and R.

land

P x R Q

1 mile

water