**Math 141 - Homework 11**   **Name:** _____

Solve each of the following optimization problems. Be sure to include confirmation that your solution is really the maximum or the minimum (use the first or second derivative test).

1. Two poles are connected by a wire that is also connected to the ground. The first pole is 20 ft tall and the second pole is 10 ft tall. There is a distance of 30 ft between the two poles. Where should the wire be anchored to the ground to minimize the amount of wire needed?
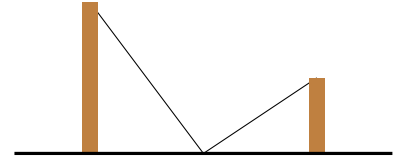
2. The sum of two positive numbers is 10. Find the values of the numbers that maximize their product.

3. What point on the line $3x + 4y = 50$ is closest to the origin?

4. A Norman window is a rectangle with a half-circle on top. If the perimeter of the window is 20 feet, find the dimensions r and h for the Norman window that has the largest possible area.