For the following problems, first find the objective and constraint equations, then solve.

(1) Find the point on the hyperbola $xy = 8$ closest to the point $(0,0)$.

(2) You have \$80 to build the perimeter of a rectangular garden. One side is going to be made of bricks and costs \$4 per foot. The other three sides will be made of wood and cost \$2 per foot. What are the length and width, in feet, of the largest garden (in terms of area) that you can build?

(3) Farmer Jane has 40 feet of fencing to make a fenced-in rectangular yard for her flock of chickens. If she uses her house for one side of the fence, what is the area of the largest yard she can make?

(4) Consider a rectangle of perimeter 12 inches. Form a cylinder by revolving this rectangle about one of its edges. What dimensions of the rectangle will result in the cylinder of maximum volume?

(5) Consider the ellipse $\frac{x^2}{4} + y^2 = 9$. What are the dimensions of the rectangle of maximum area contained in this ellipse?

You can forget about the other stuff I had on this worksheet; you don't need to learn it. Practice the power rule instead!