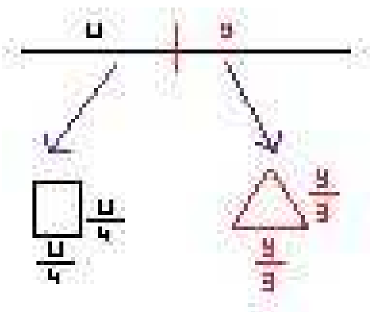
problem, I'll draw my piece of wire cut into two pieces (leaving two pieces of length u and y) and what these pieces of wire look like after they have been fashioned into a square and a triangle.



We can see from the picture that the total area enclosed by both figures is

$$A = A_1 + A_2 = (\frac{u}{4})^2 + \frac{\sqrt{3}}{4}(\frac{y}{3})^2 = \frac{u^2}{16} + \frac{\sqrt{3}}{36}y^2$$

(the second term I know by using the pythagorean theorem to solve for the height of the triangle). In this problem, the constraining equation is given by $u + y = 12$

What I'd like to do is take my expression for area and optimize it. The problem is again it sits as a function of two variables instead of one. Once again take our constraining equation and use it to solve for y in terms of u:

$$u + y = 12 \Rightarrow y = 12 - u$$

Now substitute this value for y back into my expression for area to come up with an expression that makes area a function of one variable :

$$A(u) = \frac{u^2}{16} + \frac{\sqrt{3}}{36}(12 - u)^2$$

I have area as a function of the variable u. Notice that u can vary between 0 and 12, so were now asking the following problem: find the absolute minimum (part (a)) and absolute maximum (part (b)) of the function A(u) on the interval $[0, 12]$. How do we solve this problem? First, we verify that A(u) is a continuous function on the closed interval $[0, 12]$. Since it is a