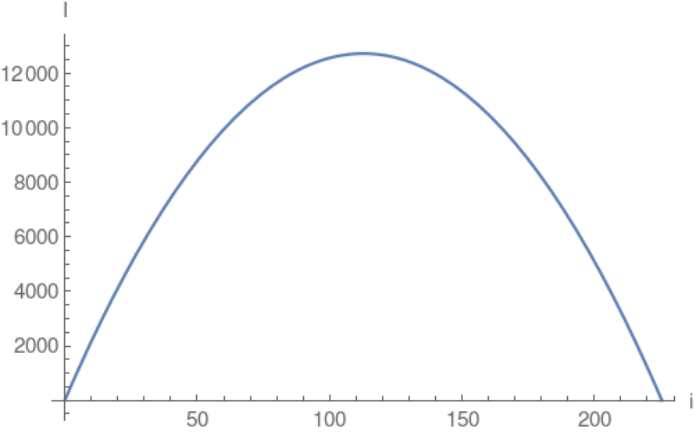
1.

1. Perimeter of rectangle $= 2(i+a) = 451$ where a is the length of the other edge of rectangle. Area of the rectangle is $= i \times a$.
Use perimeter equation
and solve for $a = \frac{451-2i}{2}$

Then reformulate the area $I = i \times a = \frac{451\,i}{2} - i^2$ which turns out to be a quadratic Parabola:



Compute the vertex $\frac{451}{4}$ and then plug the vertex into the area which will compute the maximum area.