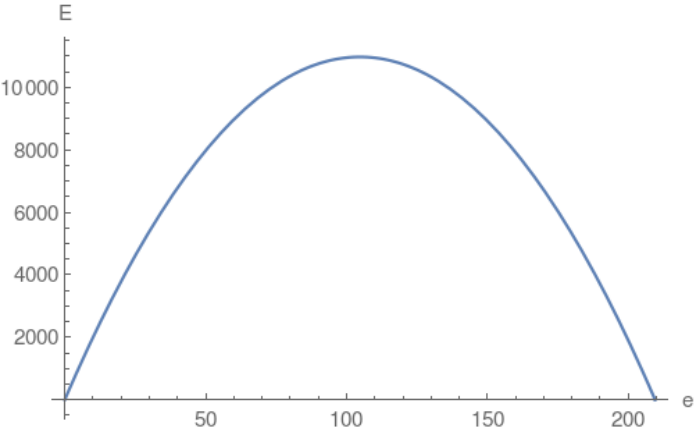
2.

2. Perimeter of rectangle $= 2(e+a) = 419$ where a is the length of the other edge of rectangle. Area of the rectangle is $= e \times a$.
Use perimeter equation
and solve for $a = \frac{419-2e}{2}$

Then reformulate the area $E = e \times a = \frac{419\,e}{2} - e^2$ which turns out to be a quadratic Parabola:



Compute the vertex $\frac{419}{4}$ and then plug the vertex into the area which will compute the maximum area.