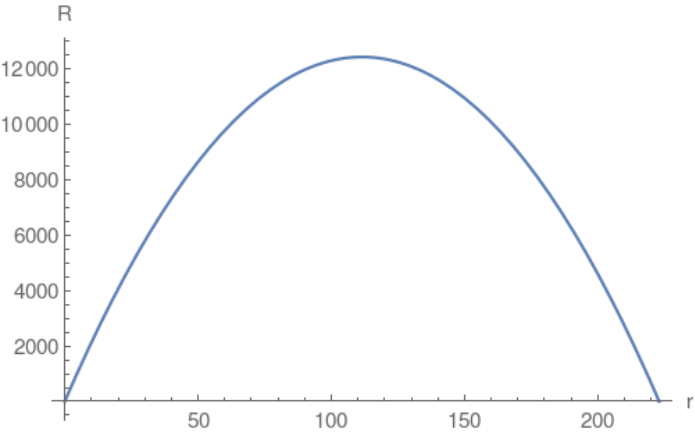
1.

1. Perimeter of rectangle $= 2(r+a) = 446$ where a is the length of the other edge of rectangle. Area of the rectangle is $= r \times a$.
Use perimeter equation
and solve for $a = \frac{446-2r}{2}$

Then reformulate the area $R = r \times a = 223\,r - r^2$ which turns out to be a quadratic Parabola:



Compute the vertex $\frac{446}{4}$ and then plug the vertex into the area which will compute the maximum area.