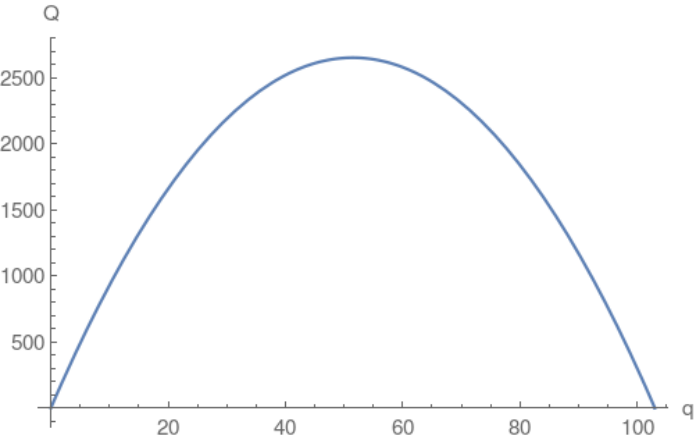
2.

2. Perimeter of rectangle $= 2(q+a) = 206$ where a is the length of the other edge of rectangle. Area of the rectangle is $= q \times a$.
Use perimeter equation
and solve for $a = \frac{206-2q}{2}$

Then reformulate the area $Q = q \times a = 103\,q - q^2$ which turns out to be a quadratic Parabola:



Compute the vertex $\frac{206}{4}$ and then plug the vertex into the area which will compute the maximum area.