1.

1. Since the fences enclose a rectangular plot without one side, two sides have length b and one side has length a:

$a + b + b = 3913 \implies a = 3913 - 2b$

the area:

$area = a \times b = (l - 2b) b = 3913\,b - 2\,b^2$

Note that the function is for parabola. Now solve for the vertex:

$vertex = (\frac{3913}{4} \text{ feet} , \frac{15\,311\,569}{8} \text{ feet}^2)$

Square the unit for vertex's vertical coordinate since it is a quadratic.