1.

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

$a+b+b=4646 \implies a=4646-2b$

the area:

$area=a \times b=(l-2b)b= 4646 b - 2 b^2$

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

$vertex= (\frac{2323}{2} \text{ feet } , \frac{5\,396\,329}{2} \text{ feet}^2)$

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