2.

2. There are 3 sides to fence, two sides with length b and one side with length a:

$a + b + b = 3681 \implies a = 3681 - 2b$

Now compute the area:

$\text{area} = a \times b = (l - 2b)b = 3681\,b - 2\,b^2$

Notice the Parabolic equation, compute the vertex:

$\text{vertex} = (\frac{3681}{4}\ \text{feet}\ ,\ \frac{13\,549\,761}{8}\ \text{feet}^2\ )$

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