

1.

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

$$a+b+b=4566 \implies a=4566-2b$$

Now solve for the area:

$$\text{area}=a \times b = (4566-2b)b = 4566b - 2b^2$$

Notice the Parabolic function, solve for the vertex:

$$\text{vertex} = \left(\frac{2283}{2} \text{ feet}, \frac{5212089}{2} \text{ feet}^2 \right)$$

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