

4.

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

$$a+b+b=2851 \Rightarrow a=2851-2b$$

Now compute the area:

$$\text{area}=a \times b = (1-2b)b = 2851b - 2b^2$$

Notice the Parabolic function, compute the vertex:

$$\text{vertex} = \left(\frac{2851}{4} \text{ feet}, \frac{8128201}{8} \text{ feet}^2 \right)$$

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