

2.

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

$$a+b+b=1257 \implies a=1257-2b$$

the area:

$$\text{area}=a \times b = (1257-2b)b = 1257b - 2b^2$$

Note that the equation is for parabola. Now compute the vertex:

$$\text{vertex} = \left(\frac{1257}{4} \text{ ft}, \frac{1580049}{8} \text{ ft}^2 \right)$$

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