

4.

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

$$a + b + b = 1853 \implies a = 1853 - 2b$$

the area:

$$\text{area} = a \times b = (1853 - 2b)b = 1853b - 2b^2$$

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

$$\text{vertex} = \left(\frac{1853}{4} \text{ feet}, \frac{3433609}{8} \text{ feet}^2 \right)$$

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