

4.

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

$$a+b+b=1583 \implies a=1583-2b$$

the area:

$$\text{area}=a \times b = (1583-2b)b = 1583b - 2b^2$$

Note that the function is for parabola. Now solve for the vertex:

$$\text{vertex} = \left(\frac{1583}{4} \text{ m}, \frac{2505889}{8} \text{ m}^2 \right)$$

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