

1.

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

$$a + b + b = 1161 \implies a = 1161 - 2b$$

the area:

$$\text{area} = a \times b = (1161 - 2b)b = 1161b - 2b^2$$

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

$$\text{vertex} = \left(\frac{1161}{4} \text{ meters}, \frac{1347921}{8} \text{ meters}^2 \right)$$

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