

1.

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

$$a + b + b = 2009 \implies a = 2009 - 2b$$

the area:

$$\text{area} = a \times b = (1 - 2b)b = 2009b - 2b^2$$

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

$$\text{vertex} = \left( \frac{2009}{4} \text{ yd}, \frac{4036081}{8} \text{ yd}^2 \right)$$

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