

3.

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

$$a+b+b=4172 \Rightarrow a=4172-2b$$

the area:

$$\text{area}=a \times b = (4172-2b)b = 4172b - 2b^2$$

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

$$\text{vertex} = (1043 \text{ yards}, 2175698 \text{ yards}^2)$$

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