

4.

4. There are 3 sides to fence, two sides with length b and one side with length a :

$$a+b+b=3251 \Rightarrow a=3251-2b$$

Now find the area:

$$\text{area}=a \times b = (1-2b)b = 3251b - 2b^2$$

Notice the Parabolic formula, find the vertex:

$$\text{vertex} = \left(\frac{3251}{4} \text{ yards}, \frac{10569001}{8} \text{ yards}^2 \right)$$

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