4.

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

$a+b+b=4643 \implies a=4643-2b$

the area:

$\text{area}=a\times b=(l-2b)\,b=\ 4643\,b-2\,b^2$

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

$\text{vertex}=\ \left(\frac{4643}{4}\ \text{yd}\ ,\ \frac{21557449}{8}\ \text{yd}^2\right)$

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