4.

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

$a + b + b = 4219 \implies a = 4219 - 2b$

the area:

$area = a \times b = (l - 2b)\,b = 4219\,b - 2\,b^2$

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

$vertex = (\frac{4219}{4}\ \text{ft}\ ,\ \frac{17\,799\,961}{8}\ \text{ft}^2\ )$

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