4.

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

$a+b+b=1553 \implies a=1553-2b$

the area:

$area=a \times b=(l-2b)b= 1553 b - 2 b^2$

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

$vertex= (\frac{1553}{4} ft , \frac{2411809}{8} ft^2)$

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