1.

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

$a+b+b=1242 \implies a=1242-2b$

the area:

$\text{area}=a\times b=(l-2b)\,b=\ 1242\,b-2\,b^2$

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

$\text{vertex}=\ (\frac{621}{2}\ \text{yards}\ ,\ \frac{385\,641}{2}\ \text{yards}^2\ )$

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