3.

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

$a+b+b=1782 \implies a=1782-2b$

the area:

$area=a \times b=(l-2b)\,b= 1782\,b - 2\,b^2$

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

$vertex= (\frac{891}{2}$ yd $, \frac{793\,881}{2}$ yd^2)

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