4.

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

$a+b+b=1505 \implies a=1505-2b$

the area:

$area=a \times b=(l-2b)b= 1505 b - 2 b^2$

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

$vertex= (\frac{1505}{4} yards , \frac{2\,265\,025}{8} yards^2)$

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