4.

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

$a+b+b=3999 \implies a=3999-2b$

the area:

$area=a \times b=(l-2b)b=3999\,b-2\,b^2$

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

$vertex= (\frac{3999}{4}$ yd $, \frac{15\,992\,001}{8}$ yd^2 $)$

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