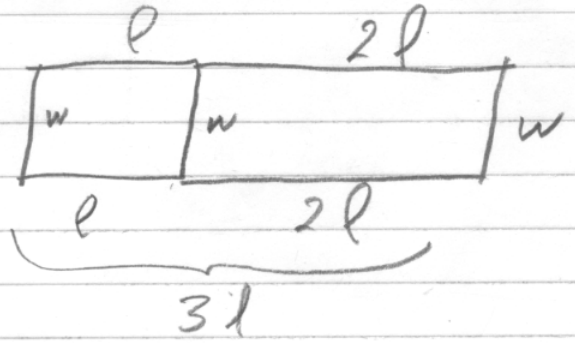
Study Guide 2, #16



Want to maximize the area,

$A = \underbrace{3l}\cdot w$

Because of the graph, the total length is $3l$, not l.

$P = 3w + 6l = 900$

$3w$ → Total width, including the divider in the middle.

$6l$ → Total length.

$\rightarrow \frac{900-3w}{6} = l$. Plug into $A = 3l \cdot w$

$\rightarrow A = 3\left(\frac{900-3w}{6}\right)\cdot w = \frac{900-3w}{2}\cdot w = 450w - \frac{3}{2}w^2$

Complete the square:

$-\frac{3}{2}w^2 + 450w = -\frac{3}{2}\left(w^2 - 300w + (150)^2 - 150^2\right)$

$= -\frac{3}{2}(w-150)^2 + \frac{3}{2}(150^2$

$= -\frac{3}{2}(w-150)^2 + 33{,}750$

→ Max area is 33,750 sq-ft.

Answer is E.