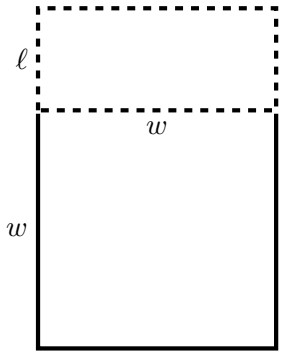
6. [11 points]

The engineer Elur Niahc has been commissioned to build a park for the citizens of Srebmun Foyoj. The park will consist of a square attached to a rectangular dog park (as shown in the diagram on the right).
The fencing for the dog park (bold, dashed line) costs \$4 per linear meter, and the fencing for the three remaining sides of the square portion of the park (bold, solid line) costs \$6 per linear meter.



a. [5 points] Assume that Elur spends \$2400 on fencing. The resulting park will have width w meters, and the length of the dog park will be ℓ meters, as shown in the diagram above. Find a formula for ℓ in terms of w.

Answer: $\ell =$ _____

b. [3 points] Let $A(w)$ be the total area (in square meters) of the resulting park (including the dog park) if the width is w meters and Elur spends \$2400 on fencing. Find a formula for the function $A(w)$. The variable ℓ should <u>not</u> appear in your answer.
(Note: This is the function that Elur would use to find the value of w maximizing the area of the park, but you should <u>not</u> do the optimization in this case.)

Answer: $A(w) =$ _____

c. [3 points] In the context of this problem, what is the domain of $A(w)$?

Answer: _____