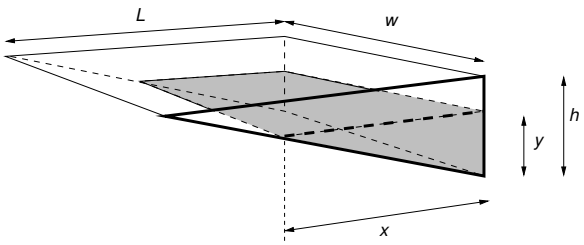
3. [12 points] Consider an abandoned zero-entry pool as suggested by the figure to the right, below. (The front face of the pool is shown with bold lines.) In the figure, w, L and h are the fixed dimensions of the pool, and x and y characterize the part that is filled with water. The corresponding volume of the filled section is $V = \frac{1}{2}\, w\, x\, y$.

a. [8 points] If the pool slowly evaporates at a volumetric rate proportional to its top surface area, write a differential equation for the volume of the water in the pool.



b. [4 points] Solve your equation from (**a**) with the initial condition $V(0) = V_0$. At what time is the pool finally empty? *(If you are unable to find an equation in (a), you may proceed with the equation* $V' = -k\sqrt{V}$*.)*