7. [13 points] A drinking water facility needs to pump water out of an underground tank. The tank is 20 meters in length with right-triangular cross-sections perpendicular to the ground as shown in the figure. The top of the tank is a 2m by 20m rectangle. The top of the tank lies 5 meters below the surface of the earth. Recall that $g = 9.8 \text{ m/s}^2$, where $g$ is the gravitational constant.

![Underground Tank](image)

a. [5 points] Write an expression for the volume (in cubic meters) of a horizontal rectangular slice of water at height $h$ above the bottom of the tank, with thickness $\Delta h$. Your answer should not involve an integral.

b. [2 points] The density of water is approximately 1000 kg/m$^3$. Write an expression for the weight (in Newtons) of the slice of water from part (a). Your answer should not involve an integral.

c. [3 points] Write an expression for the work (in Joules) needed to pump the slice of water (from parts (a) and (b)) to the surface of the earth. Your answer should not involve an integral.

d. [3 points] Assuming the tank is initially full of water, write an integral for the total work (in Joules) needed to pump all of the water to the surface of the earth.