6. [11 points] The lateral faces of a tank are determined by the curve \( y = 1 - x^4 \) and the \( x \)-axis (where \( x \) and \( y \) are measured in meters). The length of the tank is 10 meters. Be sure to include units in your answers.

\[
\begin{align*}
y = 1 - x^4
\end{align*}
\]

\[
\begin{align*}
\text{y-axis}, \quad \text{x-axis}
\end{align*}
\]

a. [5 points] The tank is filled with water to a height of one half a meter. If the density of water is 1,000 kg/m\(^3\), write an expression that approximates the mass of one slice of water \( y \) meters above the ground and \( \Delta y \) meters thick.

b. [2 points] Write a definite integral that represents the total mass of water in the tank.

c. [4 points] Write a definite integral that represents the amount of work required to pump the water to the top of the tank.