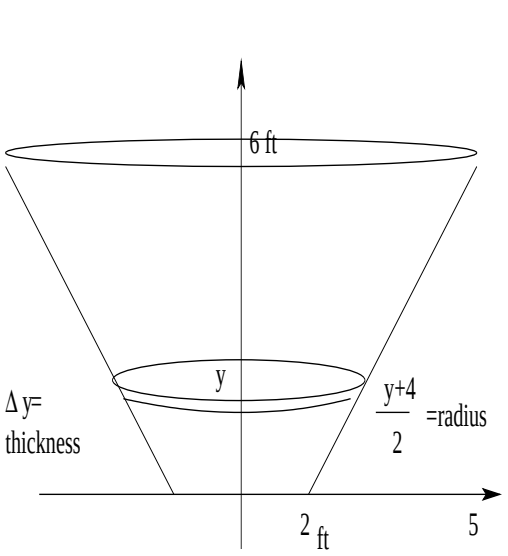
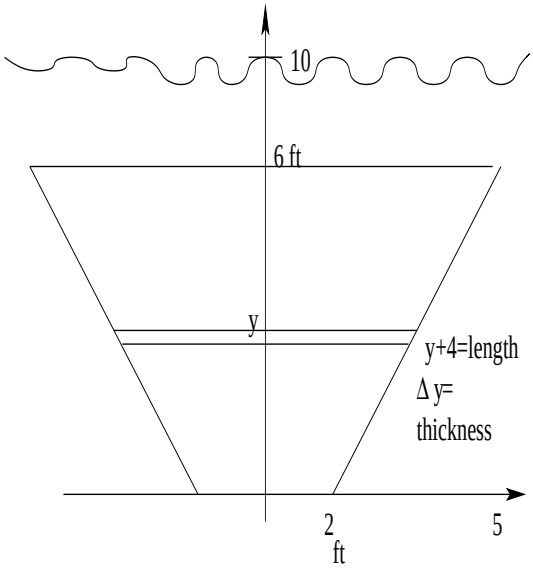
Work vs Hydrostatic Pressure and Force

Message: Look at the difference between these examples.

Work: Consider the line segment given by $y = 2x - 4$ from $x = 2$ to $x = 5$ rotated about the y axis and set up the work to empty the water from the top of the large bowl.

Force due to Hydro Pressure: Consider the trapezoidal plate formed by the line segment $y = 2x - 4$ from $x = 2$ to $x = 5$ and its reflection over the y-axis and set up the force on the plate due to hydrostatic pressure if the plate is submerged to a depth of 10 feet.





$$\text{Work}_y = 62.4 \cdot \pi \left(\frac{y+4}{2}\right)^2 \Delta y \,(6-y)$$

volume element — distance

$$\text{Force}_y = 62.4 \cdot (y+4)\,\Delta y\,(10-y)$$

area element — depth

$$\text{Work} = 62.4 \cdot \pi \int_0^6 \left(\frac{y+4}{2}\right)^2 (6-y)\,dy \qquad \text{Force} = 62.4 \int_0^6 (y+4)(10-y)\,dy$$