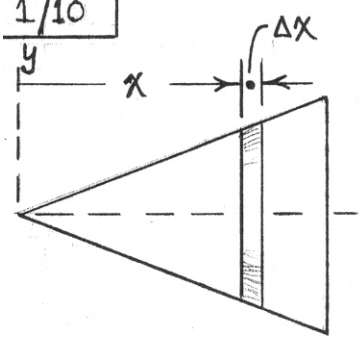
1/10



$$y(x) = \frac{r}{h}x$$

$$y(x+\Delta x) = \frac{r}{h}(x+\Delta x)$$

$$\Delta V = V(x+\Delta x) - V(x)$$

$$= \frac{1}{3}\pi\left[y(x+\Delta x)\right]^2\left[x+\Delta x\right] - \frac{1}{3}\pi\left[y(x)\right]^2\left[x\right]$$

$$= \frac{1}{3}\pi\left[\frac{r}{h}(x+\Delta x)\right]^2\left[x+\Delta x\right] - \frac{1}{3}\pi\left[\frac{r}{h}x\right]^2\left[x\right]$$

$$= \frac{1}{3}\pi\frac{r^2}{h^2}\left[(x+\Delta x)^3 - x^3\right]$$

$$= \frac{1}{3}\pi\frac{r^2}{h^2}\left[x^3 + 3x^2\Delta x + 3x(\Delta x)^2 + (\Delta x)^3 - x^3\right]$$

$$= \frac{\pi r^2}{h^2}\left[x^2\Delta x + x(\Delta x)^2 + \frac{1}{3}(\Delta x)^3\right]$$

In the limit as $\Delta x \Rightarrow dx$, the higher-order terms drop out.