Quiz 7, Nov. 21, 2017, 11:40 class

Find the volume of the solid in the first octant bounded by the coordinate planes, the plane $x = 3$, and the parabolic cylinder $z = 4 - y^2$.

$$\text{Vol} = \iint_{\text{base}} \text{top} \, dA \quad = \iint 4 - y^2 \, dA \quad = \int_0^3 \int_0^2 (4 - y^2) \, dy \, dx$$
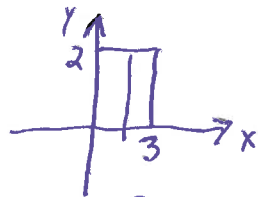
$$= \int_0^3 \left. 4y - \frac{y^3}{3} \right]_0^2 dx \quad = \int_0^3 \left(8 - \frac{8}{3} \right) dx \quad = \left. \left(8 - \frac{8}{3} \right) x \right]_0^3 \quad = \left(8 - \frac{8}{3} \right) 3$$

$$= 24 - 8 = \boxed{16}$$