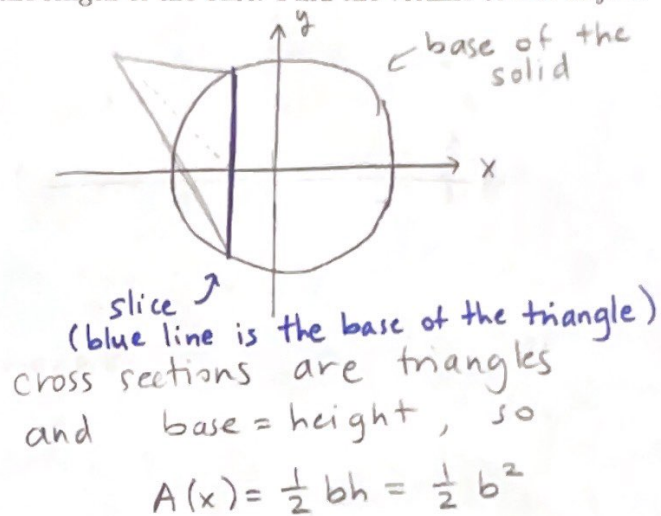
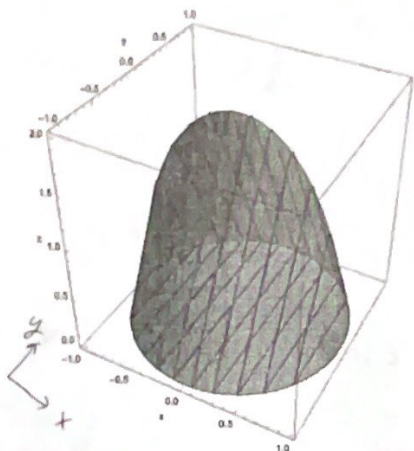
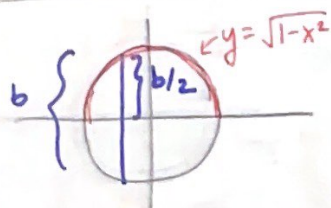


3. A solid object has as its base the circle $x^2 + y^2 = 1$. Each cross section of the object perpendicular to the x -axis is a triangle whose height equals the length of the base. Find the volume of this object.



Want b in terms of x :



$$x^2 + y^2 = 1 \xrightarrow{\text{solve for } y} y = \pm \sqrt{1-x^2}$$

$$\left(\begin{array}{l} y = \sqrt{1-x^2} \text{ is top half} \\ \text{of the circle} \\ y = -\sqrt{1-x^2} \text{ is the} \\ \text{bottom half} \end{array} \right)$$

See from the picture that $\frac{b}{2} = \sqrt{1-x^2}$

$$\boxed{b = 2\sqrt{1-x^2}}$$

$$\text{So } A(x) = \frac{1}{2}b^2 = \frac{1}{2}(2\sqrt{1-x^2})^2 = 2(1-x^2)$$

$$\begin{aligned} \Rightarrow V &= \int_{-1}^1 A(x) dx = \int_{-1}^1 2(1-x^2) dx = 2 \left(x - \frac{1}{3}x^3 \right) \Big|_{-1}^1 \\ &= 2 \left(\left(1 - \frac{1}{3}\right) - \left(-1 + \frac{1}{3}\right) \right) \\ &= 2 \left(2 - \frac{2}{3} \right) = \left(\frac{8}{3} \right) \end{aligned}$$