6.3 Volumes (Cylindrical Shells)

1. mostly used in trying to find the \( A(x) \) or \( A(y) \) one ends up with the same function is inner and the outer radius – see page 455

2. volume is the the product of the circumference, the height and thickness: \( V = 2\pi rh\Delta r \)

3. since \( r = x \) and \( h = f(x) \), we have that volume is the integral of the product of the circumference and the height:
   \[
   V = \int_{a}^{b} 2\pi xf(x) \, dx
   \]

4. need to “adjust the circumference” when the volume is obtained by rotating an area about any line different than \( x\)-axis/\( y\)-axis (see example 4).

Homework: 1, 3, 5, 11, 15, 21, (set up integral for 38)