CHAPTER 5 Applications of the Definite Integral, Part 1
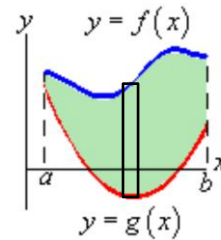
Concepts/Skills to know:

- Sketch the graphs of functions, shade in the **Region**, draw the relevant **rectangle**, and determine the lower and upper **limits of integration**.

- Use function notation to express **lengths** of vertical and horizontal line segments in the coordinate plane.

- Find **Areas** by using the **Definite Integral**

functions of **x**   top – bottom

Scan $_a{\rightarrow}_b$ $A = \int_a^b \left[f(x) - g(x) \right] dx$

                                                                              ↑
                                                                          width

"functions" of **y**   right – left

Scan $\uparrow_c^d$ $A = \int_c^d \left[f(y) - g(y) \right] dy$

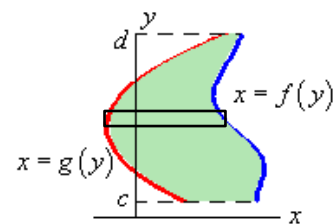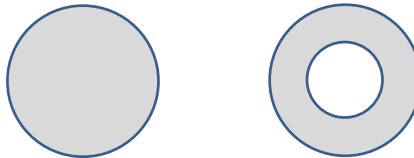   ↑
                                                                          width

- Use function notation to express Areas of **disks** and of **washers** (rings) in the coordinate space.

- Find **Volumes** for Solids of Revolution (Disk/Washer Method) by using the **Definite Integral**

Scan $_a{\rightarrow}_b$ $V = \int_a^b \left[\pi \left(\dfrac{outer}{radius} \right)^2 - \pi \left(\dfrac{inner}{radius} \right)^2 \right] dx$

                                           ↑ functions of **x** ↗   thickness

Scan $\uparrow_c^d$ $V = \int_c^d \left[\pi \left(\dfrac{outer}{radius} \right)^2 - \pi \left(\dfrac{inner}{radius} \right)^2 \right] dy$

                                           ↑ "functions" of **y** ↗   thickness

- Find exact _and_ approximate answers.