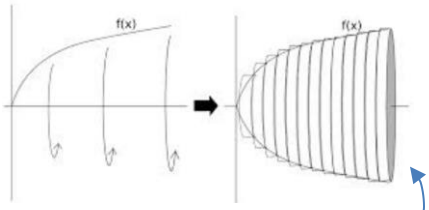
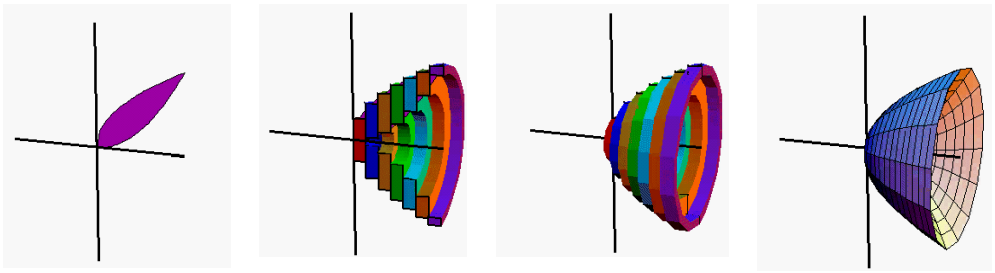
AP Calculus Ch. 7.2b: Volume by Washer Method Notes

Reviewing **Disc Method**



Disc Method: $V = \pi \int_{x_1}^{x_2} [R(x)]dx$

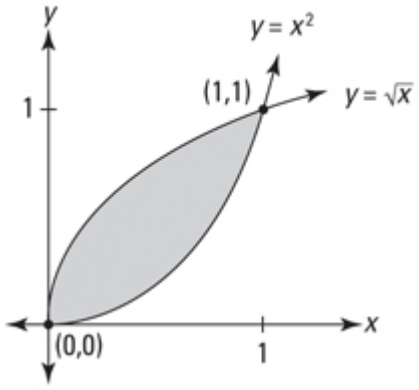
Illustration of **Washer Method**

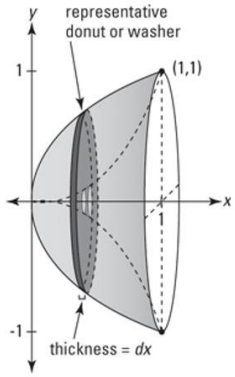


Washer Method: (Top – Bottom) , Vertical Radius (Horizontal AOR)	**Washer Method: (Right – Left) , Horizontal Radius (Vertical AOR)**
$V = \pi \int_{x_1}^{x_2} [R(x)]^2 - [r(x)]^2 \, dx$	$V = \pi \int_{y_1}^{y_2} [R(y)]^2 - [r(y)]^2 dy$
(expression(s) used above has form: " y = ___")	(expression(s) used above has form: " x = ___")

Radius [R(x) or R(y)] - distance from the AOR (Axis of Revolution) to the **outer**(further)curve
radius[r(x) or r(y)] - distance from the AOR (Axis of Revolution) to the **inner**(closer) curve

Example 1: Find the volume of the solid enclosed by the graphs of $y = x^2$ and $y = \sqrt{x}$, and revolving about the x-axis.





Example 2: Find the volume of the solid created by revolving the function $y = x^2 + 1$ bounded by the line $y = 2$ revolved about the x-axis.

Washer Method: (Top – Bottom), Vertical Radius (Horizontal AOR)	**Washer Method: (Right – Left), Horizontal Radius (Vertical AOR)**
$V = \pi \int_{x_1}^{x_2} [R(x)]^2 - [r(x)]^2 \, dx$	$V = \pi \int_{y_1}^{y_2} [R(y)]^2 - [r(y)]^2 dy$
(expression(s) used above has form: " y = ___")	(expression(s) used above has form: " x = ___")

Radius [R(x) or R(y)] - distance from the AOR (Axis of Revolution) to the **outer**(further)curve

radius[r(x) or r(y)] - distance from the AOR (Axis of Revolution) to the **inner**(closer) curve

Example 3: Find the volume of the solid created by revolving the function $y = x^2 + 1$ bounded by the line y = 2 and the y-axis about the line y = 4

Example 4: Find the volume of the solid created enclosed region of $y = x^2$ and $y = \sqrt{x}$ revolving about the line x = -2