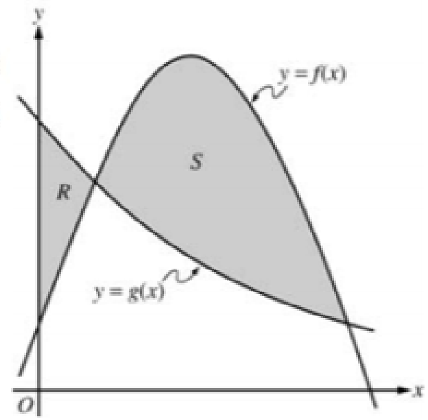
A.P. Calculus AB   Chapter 7.-7.2 Area & Volume Unit Review WS #2

1)

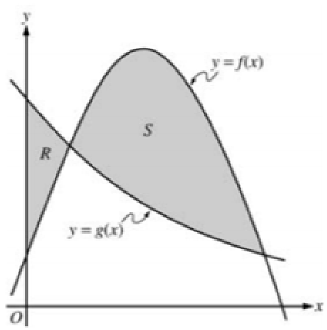
Let f and g be the functions given by $f(x) = \frac{1}{4} + \sin(\pi x)$ and $g(x) = 4^{-x}$. Let R be the shaded region in the first quadrant enclosed by the y-axis and the graphs of f and g, and let S be the shaded region in the first quadrant enclosed by the graphs of f and g, as shown in the figure above.



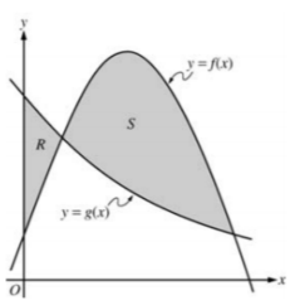
a) Find the area of S

b) Find the area of R

c) Find the volume of the solid generated when S is revolved about the horizontal line y = - 1.

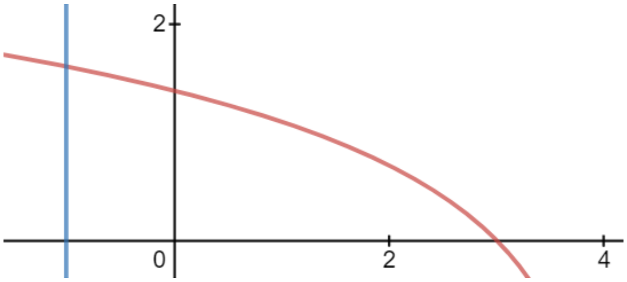


d) The enclosed region R is the base of a solid. The cross section of the solid taken <u>parallel to the y-axis</u> is a isosceles right triangle with leg on base. Find the volume of the given solid. (Write the integral notation as well as the numeric approximation rounded to 3 decimal places)

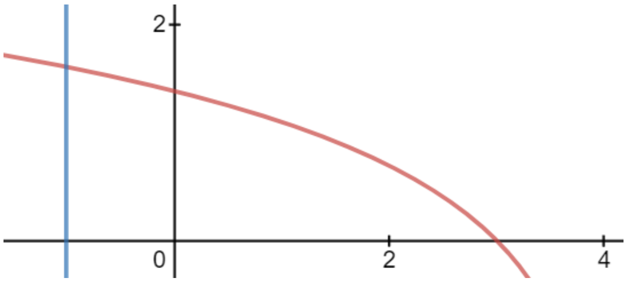


2) Given the region below enclosed by $f(x) = \ln(4 - x)$, the line x = -1, and the x-axis.

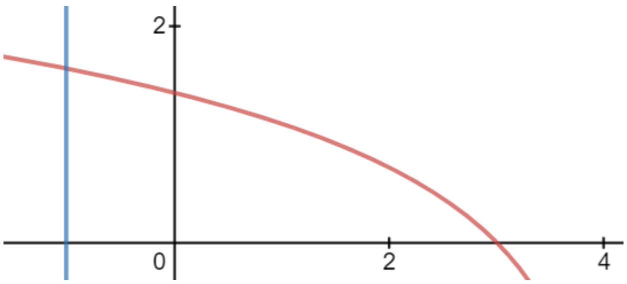
a) Find the Volume of solid generated when the enclosed region is revolved about the line x = -1 (Write the integral notation as well as the numeric approximation rounded to 3 decimal places)



b) Find the Volume of solid generated when the enclosed region is revolved about the line x = 4 (Write the integral notation as well as the numeric approximation rounded to 3 decimal places)



c) The enclosed region is the base of a solid. The cross section of the solid taken <u>parallel to the x-axis</u> is a rectangle whose height is 4. Find the volume of the given solid. (Write the integral notation as well as the numeric approximation rounded to 3 decimal places)



7.1-7.2 Area & Volume Formula Sheet

$$\textbf{Area} = \int_{x_1}^{x_2} (Top\ \ graph - Bottom\ graph)dx$$

(in the forms of " y = __ ")

$$\textbf{Area} = \int_{y_1}^{y_2} (Right\ graph - Left\ graph)dy$$

(in the form of " x = ___ ")

Disc Method: (Top – Bottom) – Vertical Radius – Horizontal AOR

$$V = \pi \int_{x_1}^{x_2} [\,R(x)]^2\ dx$$

(expression(s) used above has form: " y = ___")

Disc Method: (Right – Left) – Horizontal Radius Vertical AOR

$$V = \pi \int_{y_1}^{y_2} [\,R(y)]^2\ dy$$

(expression(s) used above has form: " x = ___")

Washer Method: (Top – Bottom) , Vertical Radius (Horizontal AOR)

$$V = \pi \int_{x_1}^{x_2} [\,R(x)]^2 - [\,r(x)]^2\ dx$$

(expression(s) used above has form: " y = ___")

Washer Method: (Right – Left) , Horizontal Radius (Vertical AOR)

$$V = \pi \int_{y_1}^{y_2} [\,R(y)]^2 - [\,r(y)]^2 dy$$

(expression(s) used above has form: " x = ___")

Top-Bottom Vertical base

$$V = \int_{x_1}^{x_2} [\textbf{Area of cross section}]dx$$

*Note: All values in integral are in terms of x
(in the form of " y = ____")

Right-Left Horizontal base

$$V = \int_{y_1}^{y_2} [\textbf{Area of cross section}]dy$$

*Note: All values in integral are in terms of y
(in the forms of " x = _______")

Area formulas for Cross sections:

1. Square: $A = (base)^2$	2. Isosceles Right Triangle (**leg** on base): $A = \frac{1}{2}(base)^2$	3. Isosceles Right Triangle (**hypotenuse** on base): $A = \frac{1}{4}(base)^2$
4. Rectangle: A = (base)(height)	5. Equilateral Triangle: $A = \frac{\sqrt{3}}{4}(base)^2$	6. Semicircle: $A = \frac{\pi}{8}(base)^2$