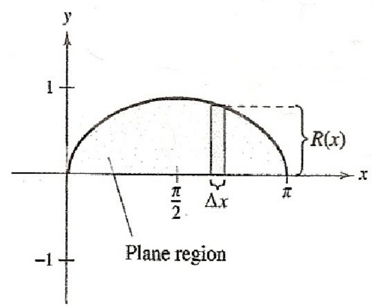
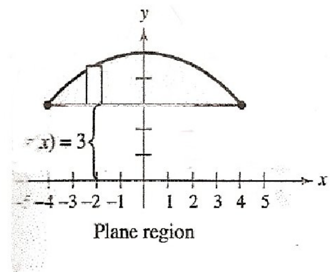
Volume Match Lab

Match each Graph of Bounded Region it to its Resulting Solid Figure and Equation(s), Boundaries & axis of Rotation. Then, write the integral needed to find the volume of the resulting solid. Find the volume, where possible.

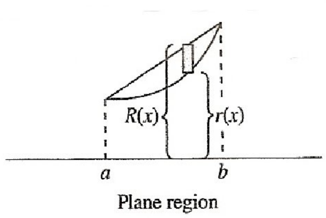
Graph of Bounded Region	Resulting Solid Figure	Equation(s), Boundaries, & axis of Rotation	Integral Expression for Finding Volume	Volume (where possible)
1				
2				
3				
4				
5				
6				



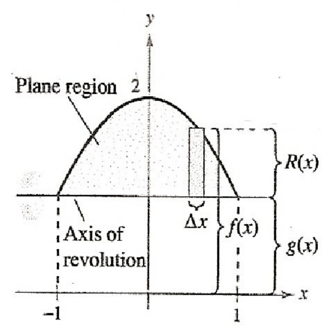
Graph of Bounded Region 1



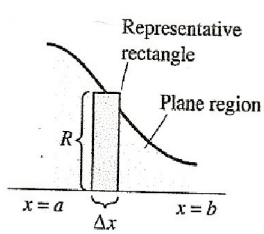
Graph of Bounded Region 2



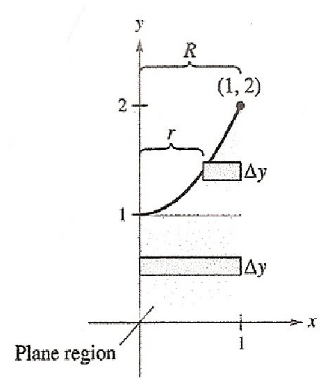
Graph of Bounded Region 3



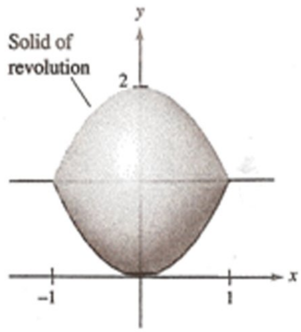
Graph of Bounded Region 4



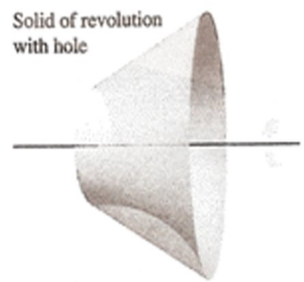
Graph of Bounded Region 5



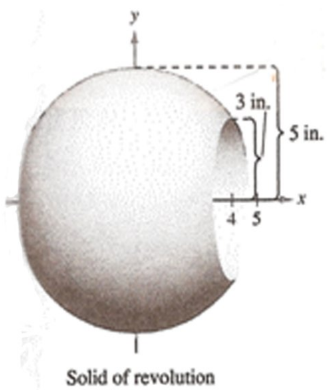
Graph of Bounded Region 6



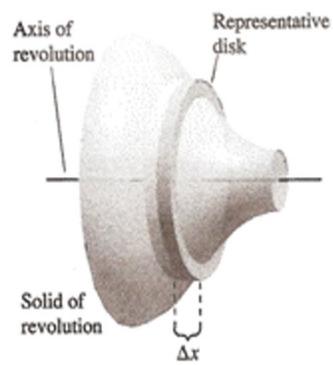
Resulting Solid Figure 1



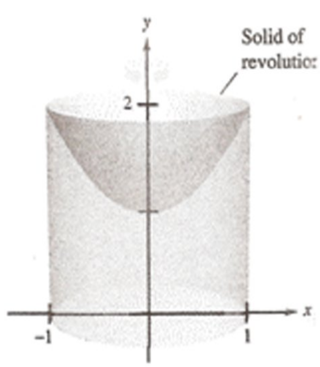
Resulting Solid Figure 2



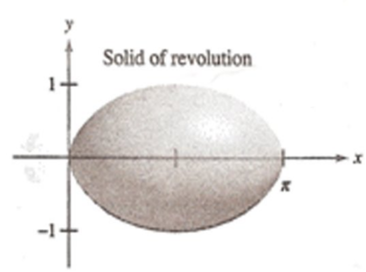
Resulting Solid Figure 3



Resulting Solid Figure 4



Resulting Solid Figure 5



Resulting Solid Figure 6

The region described below is to be rotated about the y-axis.

It is bounded by:

$y = x^2 + 1$, $y = 0$

$x = 0$ *and* $x = 1$.

Equations, Boundaries, Rotation 1

The region described below is to be rotated about the x-axis.

It is bounded by:

$y = \sqrt{\sin x}$, $y = 0$

$x = 0$ *and* $x = \pi$.

Equations, Boundaries, Rotation 2

The region described below is to be rotated about the y = 1.

It is bounded by:

$y = 2 - x^2$ *and* $y = 1$

Equations, Boundaries, Rotation 3

The region described below is to be rotated about the x-axis.

It is bounded by:

$y = R(x)$, $y = r(x)$

$x = a$ *and* $x = b$.

Equations, Boundaries, Rotation 4

The region described below is to be rotated about the x-axis.

It is bounded by:

$y = \sqrt{25 - x^2}$, $y = 3$

$x = -4$ *and* $x = 4$.

Equations, Boundaries, Rotation 5

The region described below is to be rotated about the x-axis.

It is bounded by:

$y = R(x)$, $y = 0$

$x = a$ *and* $x = b$.

Equations, Boundaries, Rotation 6

Volume Match Lab

Answer Sheet

Graph of Bounded Region	Resulting Solid Figure	Equation(s), Boundaries, & axis of Rotation	Integral Expression for Finding Volume	Volume (where possible)
1	6	2	$\pi \int_0^{\pi} (\sqrt{\sin x})^2\, dx$	$= 2\pi$ ≈ 6.283
2	3	5	$\pi \int_{-4}^{4} \left(\left(\sqrt{25 - x^2}\right)^2 - 3^2 \right) dx$	$= \frac{256}{3}\pi$ ≈ 268.083
3	2	4	$\pi \int_a^b (R(x))^2 - r(x)^2)\, dx$	————
4	1	3	$\pi \int_{-1}^{1} (2 - x^2 - 1)^2\, dx$	$= \frac{16}{15}\pi$ ≈ 3.351
5	4	6	$\pi \int_a^b (R(x)^2)\, dx$	————
6	5	1	Washers: $\pi \int_0^2 (1^2)\, dy - \pi \int_1^2 (y - 1)\, dy$ Shells: $2\pi \int_0^1 x (x^2 + 1)\, dx$	$= 2\pi - \frac{1}{2}\pi$ ≈ 4.712