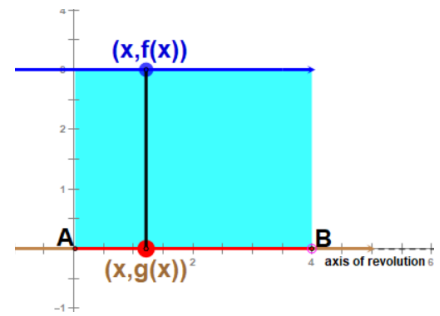
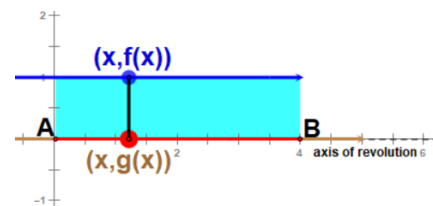


Volume Using Washer Method

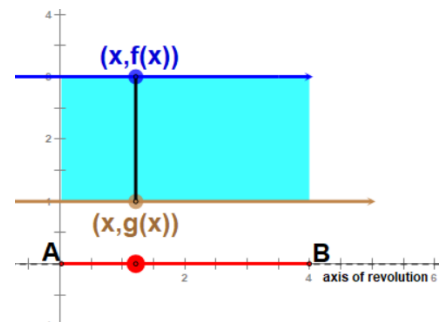
Find the volume of the solid generated by $x = 0$, $x = 4$, $y = 0$, and $y = 3$ revolved about the x -axis.



Find the volume of the solid generated by $x = 0$, $x = 4$, $y = 0$, and $y = 1$ revolved about the x -axis.



Find the volume of the solid generated by $x = 0$, $x = 4$, $y = 1$, and $y = 3$ revolved about the x -axis.



Sample Washers:

Hardware



Candy



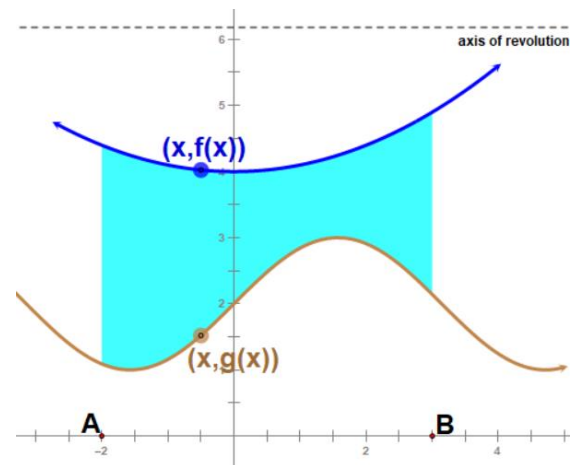
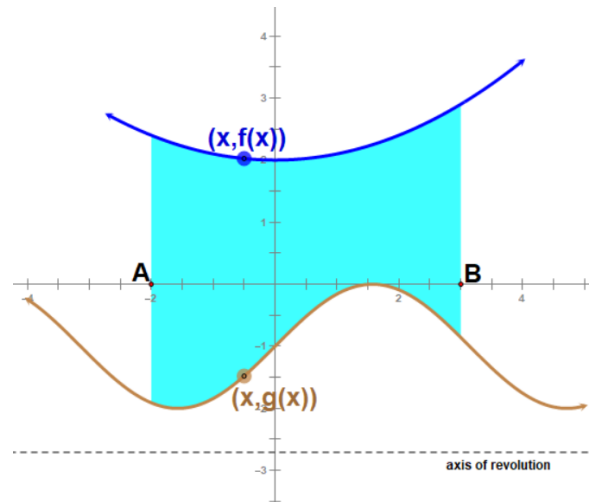
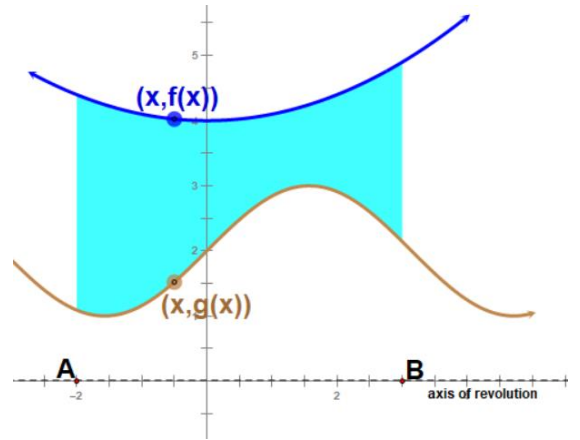
Vase



Volume of a Solid Washer Method

Revolve around an x -axis (or a horizontal axis)

$$\text{Volume} = \pi \int_a^b \left((R(x))^2 - (r(x))^2 \right) dx$$



Example 1:

Find the volume of the solid formed by revolving the area of the region bounded by $y = 2x$, $y = 4$, and $x = 0$ about the x -axis.

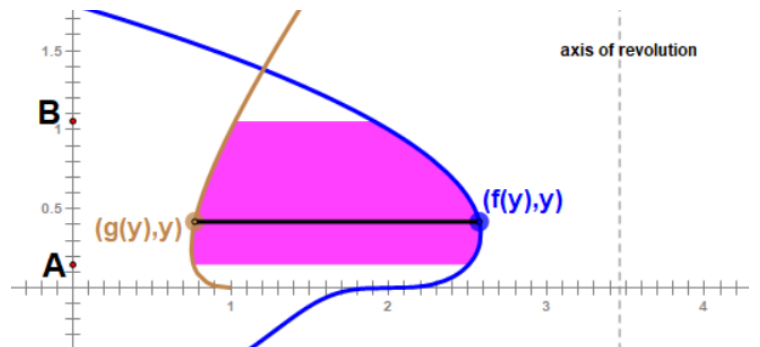
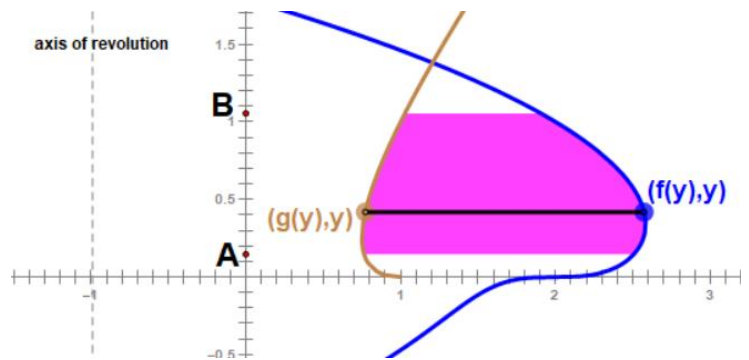
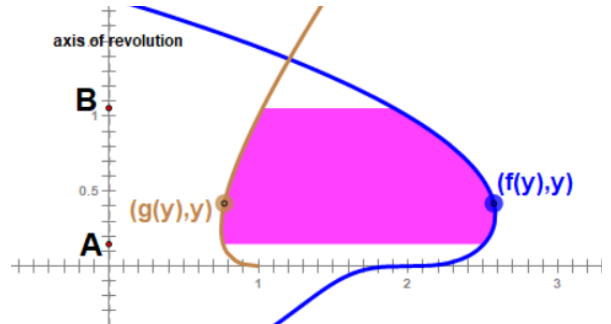
Example 2:

Find the volume of the solid formed by revolving the area of the region bounded by $y = 2x$, $y = 4$, and $x = 0$ about the line $y = 6$.

Volume of a Solid Washer Method

Revolve around an y -axis (or a vertical axis)

$$\text{Volume} = \pi \int_c^d \left((R(y))^2 - (r(y))^2 \right) dy$$



Example 3:

Find the volume of the solid formed by revolving the area of the region bounded by $y = x^2$, $y = 0$, and $x = 2$ about the y -axis.

Example 4:

Find the volume of the solid formed by revolving the area of the region bounded by $y = x^2$, $y = 0$, and $x = 2$ about the line $x = -1$.