Volume of a Solid

The volume of a solid can be found by finding the sum of the area of the cross sections.

$$V = \int_a^b A(x)\,dx.$$

How to Find Volume by Slicing

1. Sketch the solid and a typical cross section.

2. Find a formula for the area of the cross section.

3. Find the bounds of integration.

4. Integrate A(x) to find volume.

Solids of Revolution
-Formed when a curve or region is revolved
 around a line.

-The cross section of a solid of revolution is
 circular.

-These cross sections are either in the
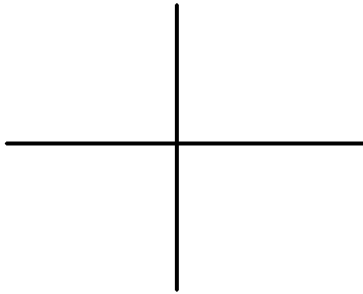 shape of a disc or a washer (donut!!!).

Find the volume of the solid generated by
revolving the region bounded by the lines and
curves about the line y = 5.

$y=2x$ $x=2$ $y=0$
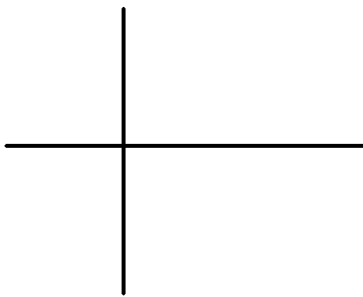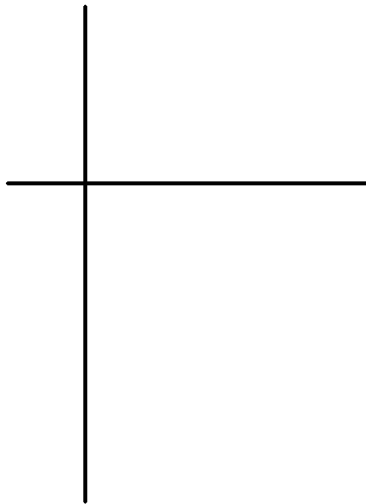
Find the volume of the solid generated by revolving the region bounded by the lines and curves about the line y-axis.
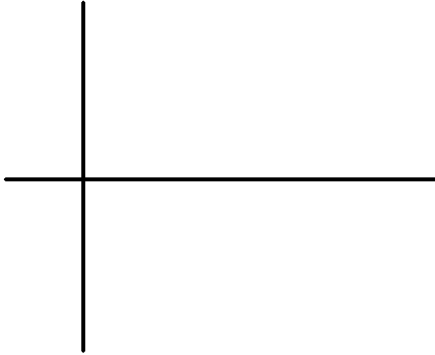
$y=2x \quad x=2 \quad y=0$

Find the volume of the solid generated by revolving the region bounded by the lines and curves about the line y = -2.

$y=x^2 \quad y=0 \quad x=3$

Find the volume of the solid generated by revolving the region bounded by the lines and curves about the line x = 4.

$y=x^2$ $y=0$ $x=3$

Find the volume of the solid generated by revolving the region bounded by the lines and curves about the line y = -1.

$y=4-x^2$ $y=2-x$