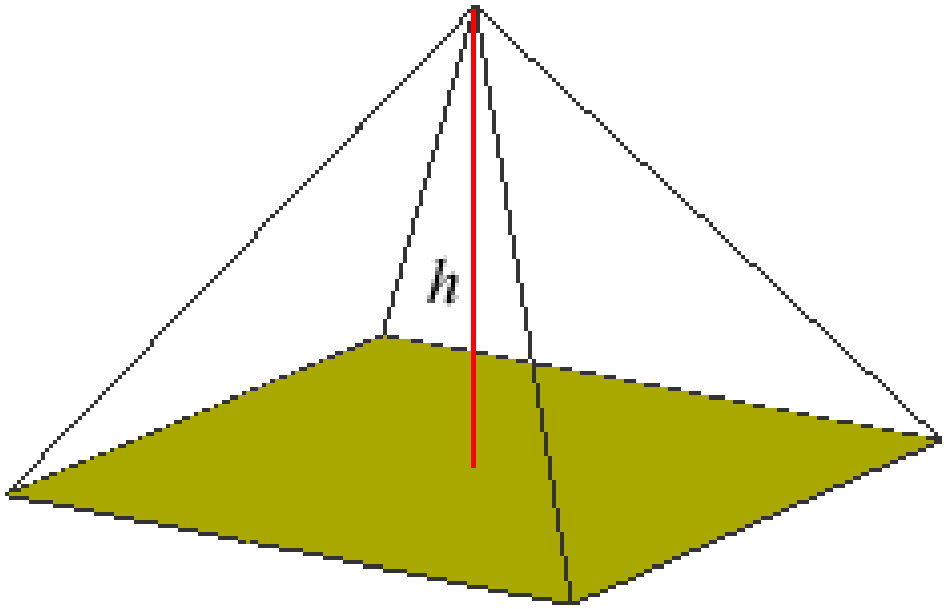
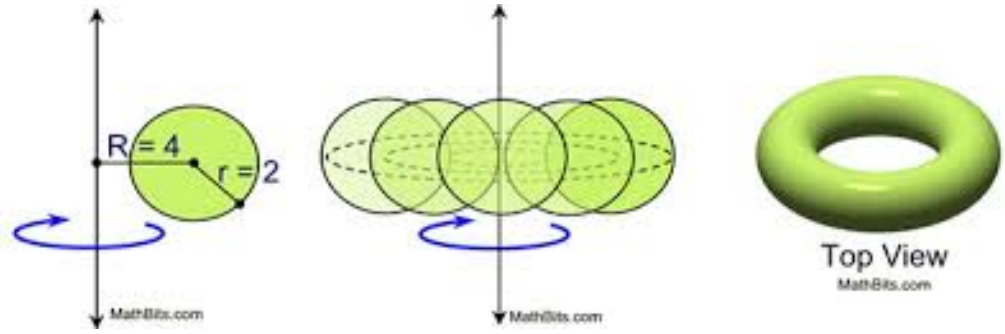
Volumes (HW #1)

We can use an integral to find a volume of a solid that is a union of disjoint areas indexed by an interval of a real line.

Find the volume of a regular pyramid with height 8 cm and square base with side length 3 cm.



Another type of solid that can be indexed by an interval of a real line are those that have rotational symmetry about a line. They can be formed by rotating a bounded region about a line. I call the indexed areas "slices." These slices can be disks, washers, or cylinders (also known as "shells").



Find the volume of a solid formed by rotating the region bounded by $y = x(1 - x)$ and $y = 0$ about the x-axis. The slices are disks.

Find the volume of a solid formed by rotating the region bounded by $y = 3 + 2x - x^2$ and $x + y = 3$ about the x-axis. Use washers for your slices.

Rotate the same region about the y-axis to form a solid E and then set-up an integral equal to the volume of E. Slices are equal to cylinders.

Let R be the region bounded by $y = x$, $x + y = 2$, and $y = 0$. Find a **single** integral equal to the volume of the solid obtained by rotating R about the following lines. Are you using washers or cylinders for you slices? Sketch R first.

1. $x = 0$

2. $y = 0$

3. $x = 4$

4. $y = 2$

5. $x = -4$