AP Calculus Name _____

7.2 Volume: Solids with Known Cross Sections

Volumes of Solids with Known Cross Sections

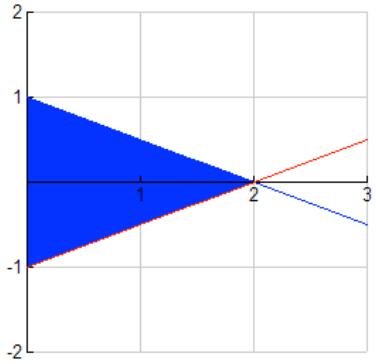
1) For cross sections of area A(x) taken perpendicular to the x-axis:

$$\text{Volume} = \int_a^b A(x)dx$$

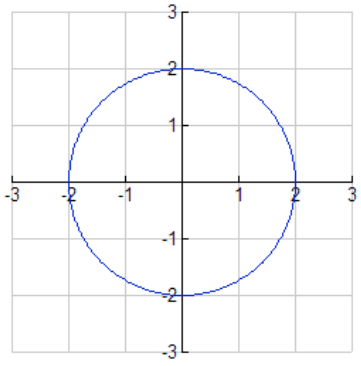
2) For cross sections of area A(y) taken perpendicular to the y-axis:

$$\text{Volume} = \int_c^d A(y)dy$$

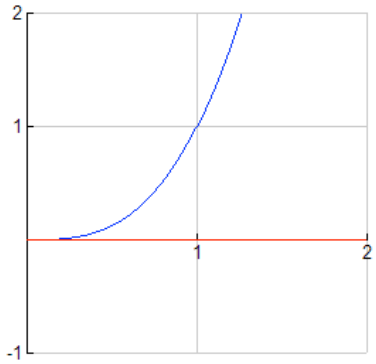
1) Find the volume of the solid shown in Figure 7.25 on page 462. The base of the solid is the region bounded by the lines $f(x) = 1 - \frac{x}{2}$, $g(x) = -1 + \frac{x}{2}$, and x = 0. The cross sections perpendicular to the x-axis are equilateral triangles.



2) Find the volume of the solid whose base is bounded by the circle $x^2 + y^2 = 4$ with semi-circle cross sections that are perpendicular to the x-axis. (Page 466 #62c)



3) Find the volume of the solid whose base is bounded by $y = x^3$, $y = 0$, and $x = 1$ with square cross sections that are perpendicular to the y-axis. (Page 466 #63a)



4) Find the volume of the solid whose base is bounded by $y = 4\sqrt{\sin x},\ 0 \le x \le \pi$ with equilateral triangle cross sections that are perpendicular to the x-axis.