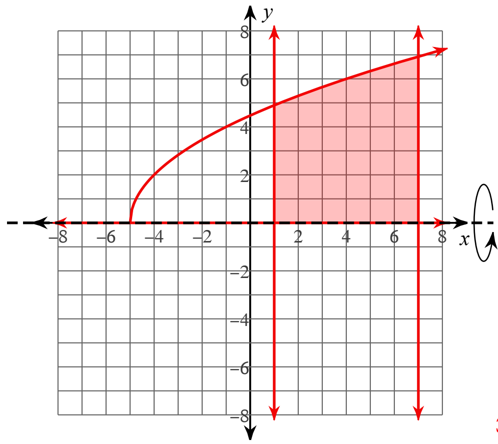
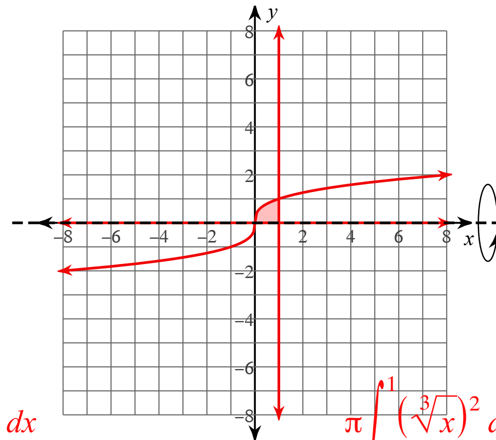
For each problem, find the volume of the solid that results when the region enclosed by the curves is revolved about the *x*-axis. Set up, but do not evaluate the integral. You may use the provided graph to sketch the curves and shade the enclosed region.

1) $y = 2\sqrt{x+5},\ \ y = 0,\ \ x = 1,\ \ x = 7$



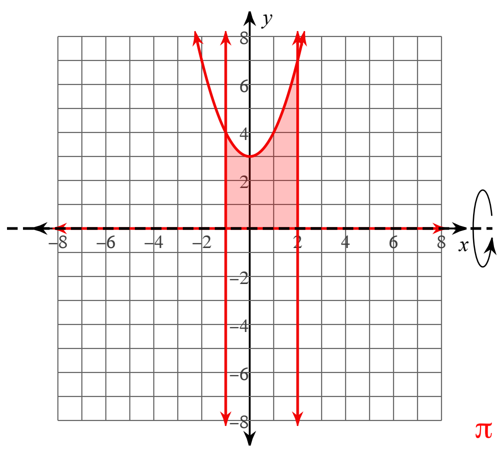
$\pi \int_{1}^{7} \left(2\sqrt{x+5}\right)^2 dx$

2) $y = \sqrt[3]{x},\ \ y = 0,\ \ x = 1$



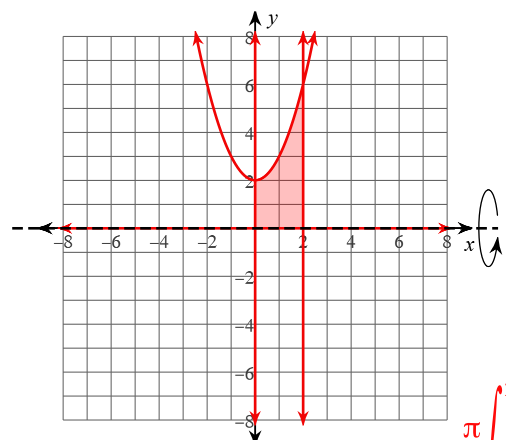
$\pi \int_{0}^{1} \left(\sqrt[3]{x}\right)^2 dx$

3) $y = x^2 + 3,\ \ y = 0,\ \ x = -1,\ \ x = 2$



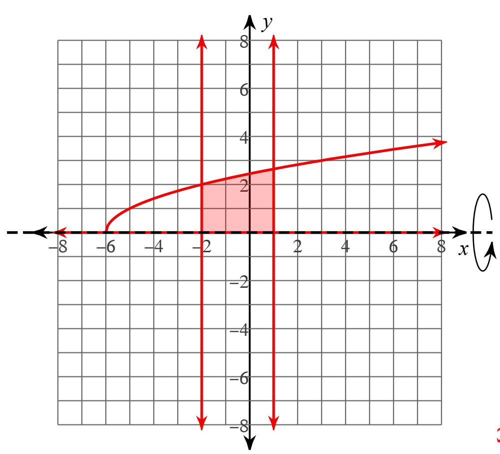
$\pi \int_{-1}^{2} \left(x^2 + 3\right)^2 dx$

4) $y = x^2 + 2,\ \ y = 0,\ \ x = 0,\ \ x = 2$



$\pi \int_{0}^{2} \left(x^2 + 2\right)^2 dx$

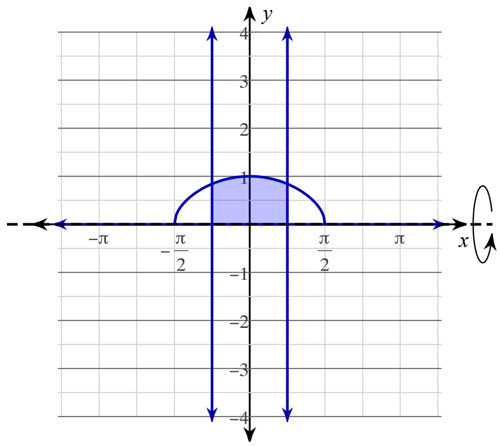
5) $y = \sqrt{x+6},\ \ y = 0,\ \ x = -2,\ \ x = 1$



$\pi \int_{-2}^{1} \left(\sqrt{x+6}\right)^2 dx$

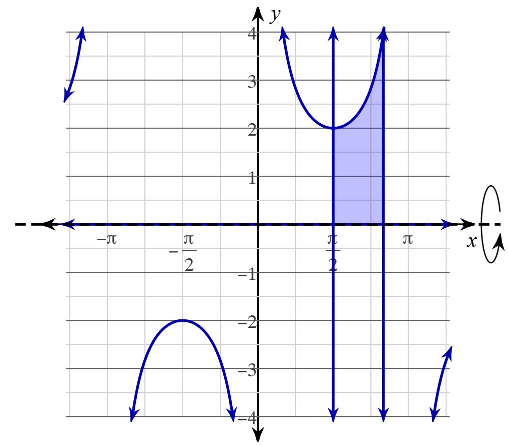
For each problem, find the volume of the solid that results when the region enclosed by the curves is revolved about the x-axis. Set up, but do not evaluate the integral.

6) $y = \sqrt{\cos x},\ y = 0,\ x = -\frac{\pi}{4},\ x = \frac{\pi}{4}$



$$\pi \int_{-\frac{\pi}{4}}^{\frac{\pi}{4}} \left(\sqrt{\cos x}\right)^2 dx$$

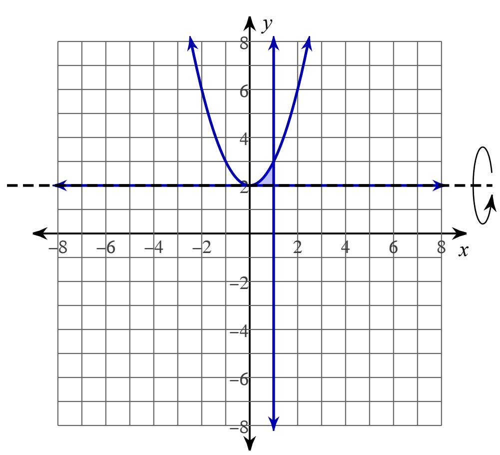
7) $y = 2\csc x,\ y = 0,\ x = \frac{\pi}{2},\ x = \frac{5\pi}{6}$



$$\pi \int_{\frac{\pi}{2}}^{\frac{5\pi}{6}} (2\csc x)^2\, dx$$

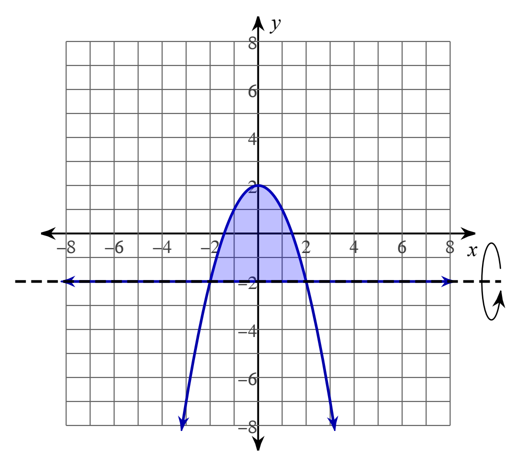
For each problem, find the volume of the solid that results when the region enclosed by the curves is revolved about the given axis. Set up, but do not evaluate the integral.

8) $y = x^2 + 2,\ y = 2,\ x = 1$
Axis: $y = 2$



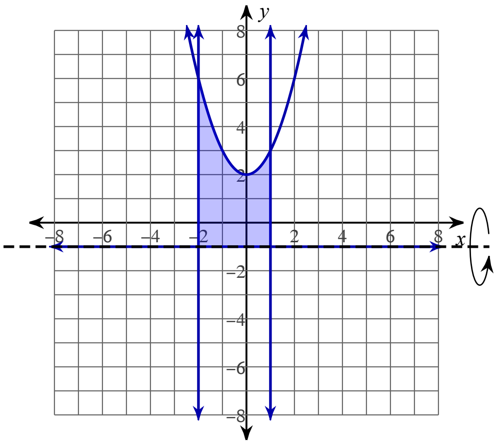
$$\pi \int_{0}^{1} \left(x^2\right)^2 dx$$

9) $y = -x^2 + 2,\ y = -2$
Axis: $y = -2$



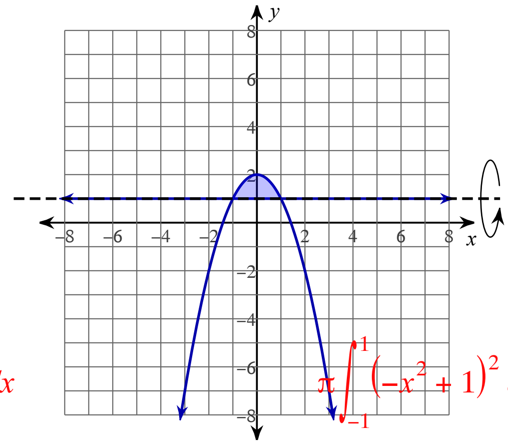
$$\pi \int_{-2}^{2} \left(-x^2 + 4\right)^2 dx$$

10) $y = x^2 + 2, \ y = -1, \ x = -2, \ x = 1$
Axis: $y = -1$



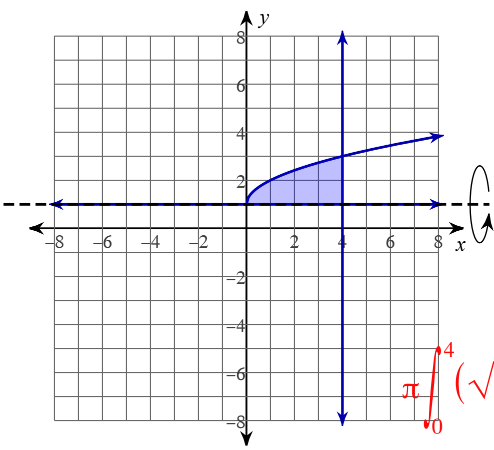
$$\pi \int_{-2}^{1} (x^2 + 3)^2 \, dx$$

11) $y = -x^2 + 2, \ y = 1$
Axis: $y = 1$



$$\pi \int_{-1}^{1} (-x^2 + 1)^2 \, dx$$

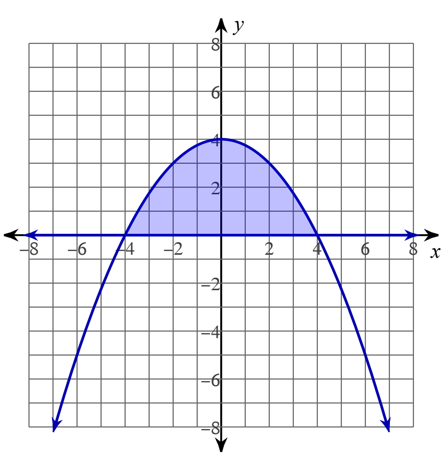
12) $y = \sqrt{x} + 1, \ y = 1, \ x = 4$
Axis: $y = 1$



$$\pi \int_{0}^{4} (\sqrt{x})^2 \, dx$$

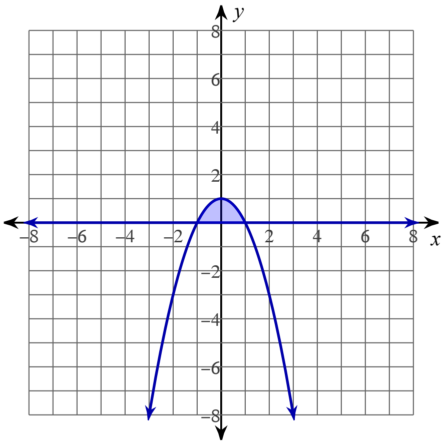
For each problem, find the volume of the specified solid. Set up, but do not evaluate the integral. A graph representing the base is provided.

13) The base of a solid is the region enclosed by $y = -\frac{x^2}{4} + 4$ and $y = 0$. Cross-sections perpendicular to the x-axis are semicircles.



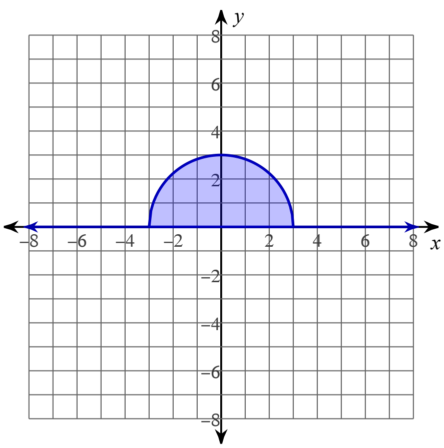
$$\frac{\pi}{8} \int_{-4}^{4} \left(-\frac{x^2}{4} + 4\right)^2 \, dx$$

14) The base of a solid is the region enclosed by $y = -x^2 + 1$ and $y = 0$. Cross-sections perpendicular to the x-axis are squares.



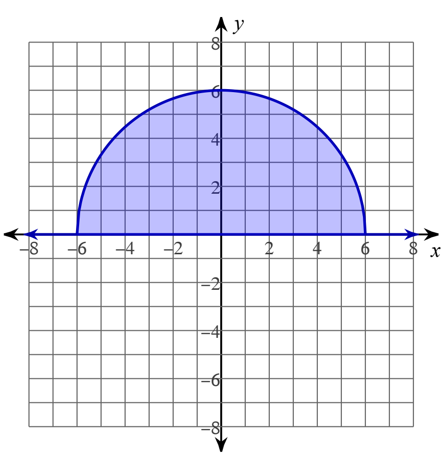
$\int_{-1}^{1} \left(-x^2 + 1\right)^2$ d

15) The base of a solid is the region enclosed by the semicircle $y = \sqrt{9 - x^2}$ and the x-axis. Cross-sections perpendicular to the x-axis are equilateral triangles.



$\frac{\sqrt{3}}{4}\int_{-3}^{3} \left(\sqrt{9 - x^2}\right)^2 dx$

16) The base of a solid is the region enclosed by the semicircle $y = \sqrt{36 - x^2}$ and the x-axis. Cross-sections perpendicular to the x-axis are rectangles with heights twice that of the side in the xy-plane.



$2\int_{-6}^{6} \left(\sqrt{36 - x\right.$