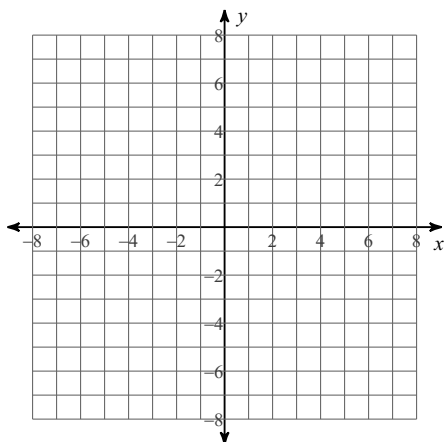


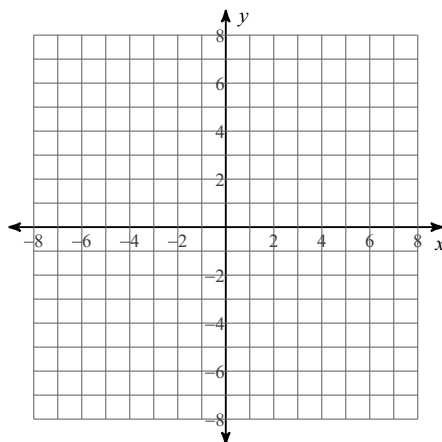
8.3 Review Problems

For each problem, find the area of the region enclosed by the curves. You may use the provided graph to sketch the curves and shade the enclosed region.

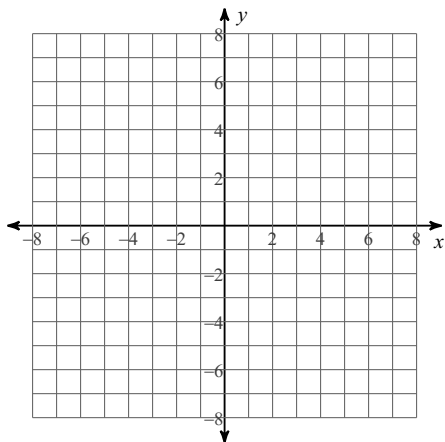
1) $y = \frac{x^3}{2} - 3x, y = \frac{x^2}{2}$



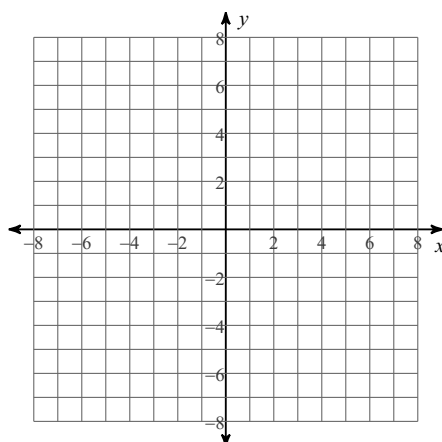
2) $y = \frac{x^3}{2} + \frac{x^2}{2} - 2x, y = x$



3) $y = x^2 - 2x - 2, y = -x^2 - 4x + 2$

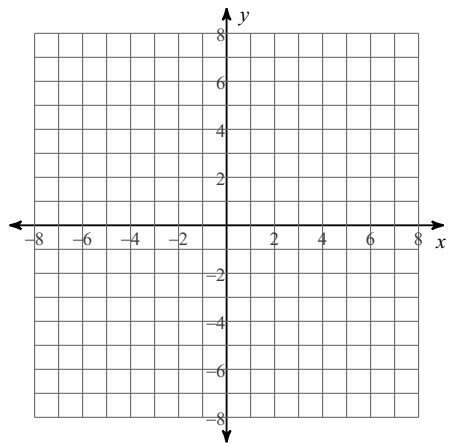


4) $y = 2\sqrt{x}, y = \frac{x^2}{4}$

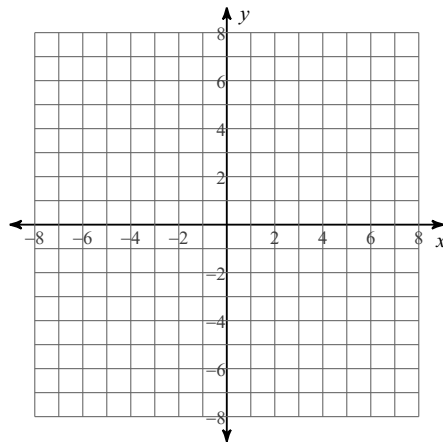


For each problem, find the volume of the solid that results when the region enclosed by the curves is revolved about the given axis. You may use the provided graph to sketch the curves and shade the enclosed region.

5) $y = x^2 + 4$, $y = 2$, $x = -2$, $x = -1$
 Axis: $y = 1$

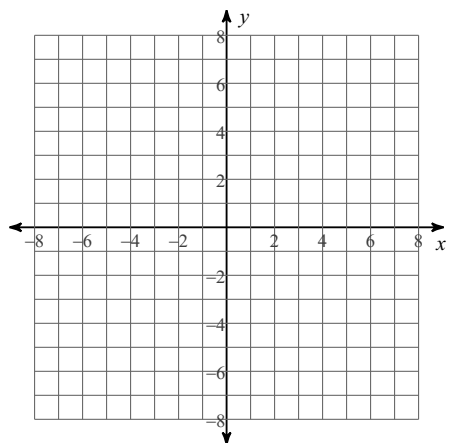


6) $x = -y^2 - 1$, $x = -2$
 Axis: $x = -2$

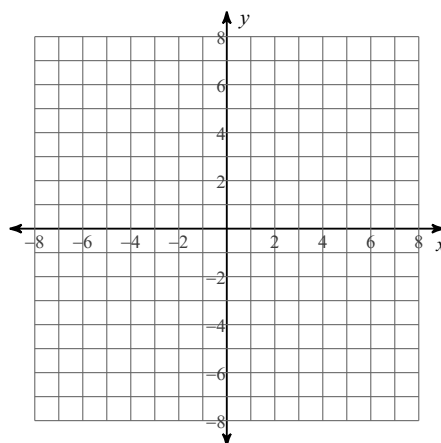


For each problem, find the volume of the solid that results when the region enclosed by the curves is revolved about the x -axis. You may use the provided graph to sketch the curves and shade the enclosed region.

7) $y = \sqrt{x}$, $y = 0$, $x = 4$



8) $y = -x^2 + 6$, $y = 2$



Answers to 8.3 Review Problems

$$\begin{aligned}
 1) \int_{-2}^0 \left(\frac{x^3}{2} - 3x - \frac{x^2}{2} \right) dx + \\
 \int_0^3 \left(\frac{x^2}{2} - \left(\frac{x^3}{2} - 3x \right) \right) dx \\
 = \frac{253}{24} \approx 10.542
 \end{aligned}$$

$$\begin{aligned}
 2) \int_{-3}^0 \left(\frac{x^3}{2} + \frac{x^2}{2} - 3x \right) dx + \\
 \int_0^2 \left(x - \left(\frac{x^3}{2} + \frac{x^2}{2} - 2x \right) \right) dx \\
 = \frac{253}{24} \approx 10.542
 \end{aligned}$$

$$\begin{aligned}
 3) \int_{-2}^1 (-x^2 - 4x + 2 - (x^2 - 2x - 2)) dx \\
 = 9
 \end{aligned}$$

$$\begin{aligned}
 4) \int_0^4 \left(2\sqrt{x} - \frac{x^2}{4} \right) dx \\
 = \frac{16}{3} \approx 5.333
 \end{aligned}$$

$$\begin{aligned}
 5) \pi \int_{-2}^{-1} \left((x^2 + 3)^2 - 1 \right) dx \\
 = \frac{141}{5} \pi \approx 88.593
 \end{aligned}$$

$$\begin{aligned}
 6) \pi \int_{-1}^1 (-y^2 + 1)^2 dy \\
 = \frac{16}{15} \pi \approx 3.351
 \end{aligned}$$

$$\begin{aligned}
 7) \pi \int_0^4 (\sqrt{x})^2 dx \\
 = 8\pi \approx 25.133
 \end{aligned}$$

$$\begin{aligned}
 8) \pi \int_{-2}^2 \left((-x^2 + 6)^2 - 2^2 \right) dx \\
 = \frac{384}{5} \pi \approx 241.274
 \end{aligned}$$