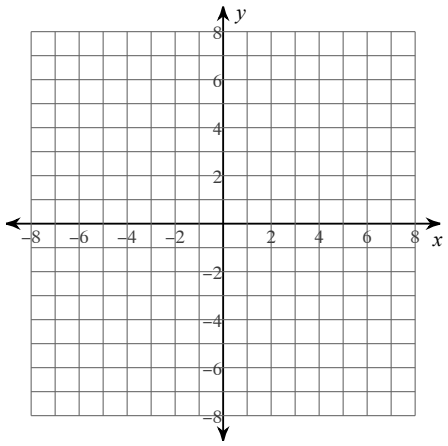
Calculus Name_____ ID: 1

Volume WASHER Method Practice

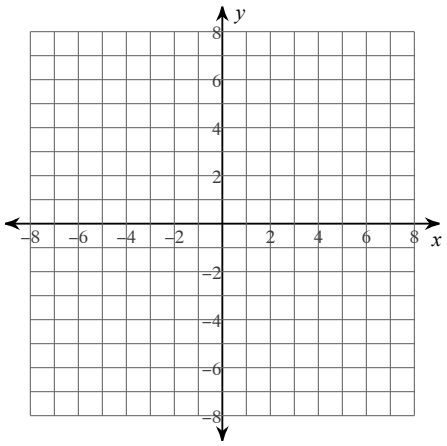
Date_____ Period____

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

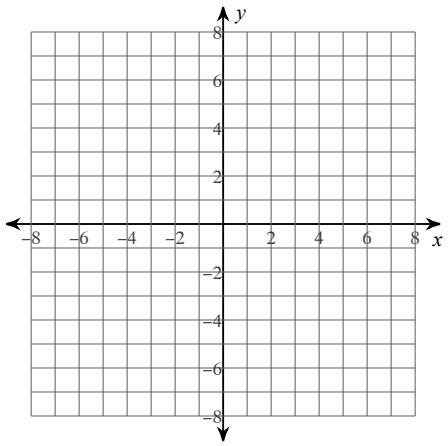
1) $y = -x^2 + 4,\ y = x + 2,\ x = 0,\ x = 1$



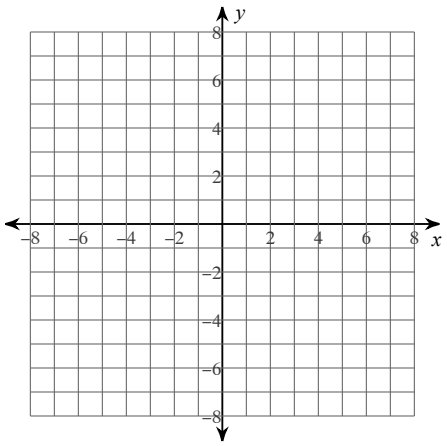
2) $y = -x^2 + 6,\ y = 2$



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

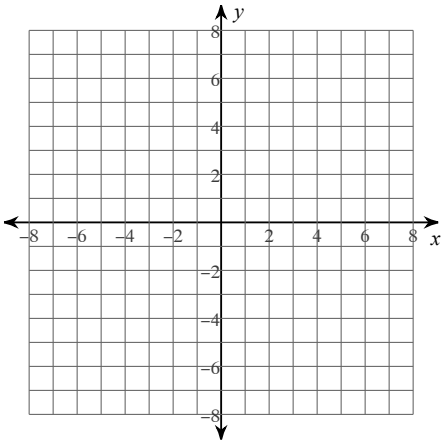


4) $y = -x^2 + 4,\ y = x^2 + 2,\ x = -1,\ x = 0$

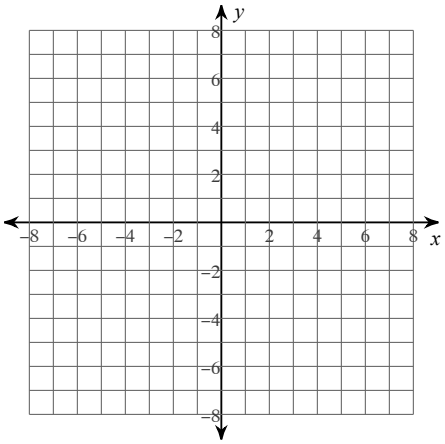


For each problem, find the volume of the solid that results when the region enclosed by the curves is revolved about the the *y*-axis. You may use the provided graph to sketch the curves and shade the enclosed region.

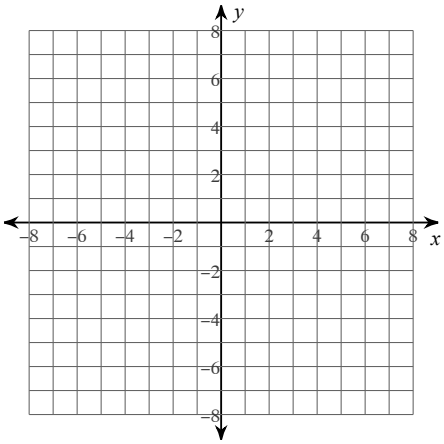
5) $x = -y^2 + 6,\ x = -y + 4$



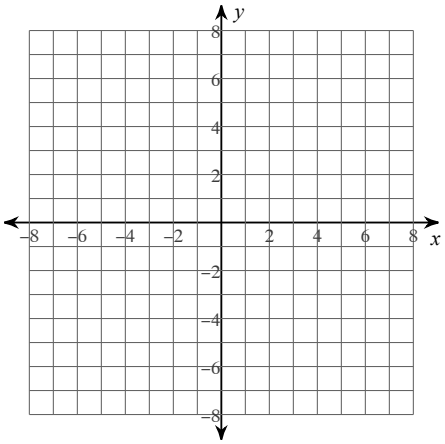
6) $x = -y^2 + 3,\ x = 2,\ y = 0,\ y = 1$



7) $x = -y^2 + 5,\ x = 1$



8) $x = y^2 + 2,\ x = 2,\ y = 2$



For each problem, find the volume of the solid that results when the region enclosed by the curves is revolved about the the given axis.

9) $y = x^2 - 3,\ y = \sqrt{x} - 3$
Axis: $y = 2$

10) $y = x^2 - 3,\ y = \sqrt{x} - 3$
Axis: $y = 1$

11) $y = x^2 + 4,\ y = 2,\ x = 0,\ x = 1$
Axis: $y = -1$

12) $y = x^2 + 3,\ y = 3,\ x = 2$
Axis: $y = 1$

13) $x = -y^2 + 5,\ x = 1,\ y = 0,\ y = 2$
Axis: $x = 1$

14) $x = y^2 + 1,\ x = -2,\ y = 0,\ y = 2$
Axis: $x = -2$

15) $x = -y^2 - 1,\ x = -2,\ y = 0,\ y = 1$
Axis: $x = -2$

16) $x = -y^2 + 2,\ x = 1,\ y = 0,\ y = 1$
Axis: $x = 1$

Answers to Volume WASHER Method Practice (ID: 1)

1) $\pi\int_{0}^{1}\left(\left(-x^2+4\right)^2-\left(x+2\right)^2\right)dx$

$=\frac{36}{5}\pi\approx 22.619$

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

$=\frac{384}{5}\pi\approx 241.274$

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

$=\frac{32}{5}\pi\approx 20.106$

4) $\pi\int_{-1}^{0}\left(\left(-x^2+4\right)^2-\left(x^2+2\right)^2\right)dx$

$=8\pi\approx 25.133$

5) $\pi\int_{-1}^{2}\left(\left(-y^2+6\right)^2-\left(-y+4\right)^2\right)dy$

$=\frac{198}{5}\pi\approx 124.407$

6) $\pi\int_{0}^{1}\left(\left(-y^2+3\right)^2-2^2\right)dy$

$=\frac{16}{5}\pi\approx 10.053$

7) $\pi\int_{-2}^{2}\left(\left(-y^2+5\right)^2-1\right)dy$

$=\frac{832}{15}\pi\approx 174.254$

8) $\pi\int_{0}^{2}\left(\left(y^2+2\right)^2-2^2\right)dy$

$=\frac{256}{15}\pi\approx 53.617$

9) $\pi\int_{0}^{1}\left(\left(5-x^2\right)^2-\left(5-\sqrt{x}\right)^2\right)dx$

$=\frac{91}{30}\pi\approx 9.529$

10) $\pi\int_{0}^{1}\left(\left(4-x^2\right)^2-\left(4-\sqrt{x}\right)^2\right)dx$

$=\frac{71}{30}\pi\approx 7.435$

11) $\pi\int_{0}^{1}\left(\left(x^2+5\right)^2-3^2\right)dx$

$=\frac{293}{15}\pi\approx 61.366$

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

$=\frac{256}{15}\pi\approx 53.617$

13) $\pi\int_{0}^{2}\left(-y^2+4\right)^2dy$

$=\frac{256}{15}\pi\approx 53.617$

14) $\pi\int_{0}^{2}\left(y^2+3\right)^2dy$

$=\frac{202}{5}\pi\approx 126.92$

15) $\pi\int_{0}^{1}\left(-y^2+1\right)^2dy$

$=\frac{8}{15}\pi\approx 1.676$

16) $\pi\int_{0}^{1}\left(-y^2+1\right)^2dy$

$=\frac{8}{15}\pi\approx 1.676$