Volume WASHER Method Practice

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.

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

\[ \frac{36}{5} \pi \approx 22.619 \]

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

\[ \frac{384}{5} \pi \approx 241.274 \]

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

\[ \frac{32}{5} \pi \approx 20.106 \]

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

\[ 8 \pi \approx 25.133 \]

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

\[ \frac{198}{5} \pi \approx 124.407 \]

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

\[ \frac{16}{5} \pi \approx 10.053 \]

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

\[ \frac{832}{15} \pi \approx 174.254 \]

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

\[ \frac{256}{15} \pi \approx 53.617 \]

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

\[ \frac{91}{30} \pi \approx 9.529 \]

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

\[ \frac{71}{30} \pi \approx 7.435 \]

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

\[ \frac{293}{15} \pi \approx 61.366 \]

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

\[ \frac{256}{15} \pi \approx 53.617 \]

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

\[ \frac{256}{15} \pi \approx 53.617 \]

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

\[ \frac{202}{5} \pi \approx 126.92 \]

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

\[ \frac{8}{15} \pi \approx 1.676 \]

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

\[ \frac{8}{15} \pi \approx 1.676 \]