

Assignment: Volume of Revolution-2

Date _____

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

1) $x = \csc y, x = 0, y = \frac{\pi}{2}, y = \frac{3\pi}{4}$

2) $x = 2\sec y, x = 0, y = -\frac{\pi}{3}, y = 0$

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

3) $y = 2\csc x, y = \csc x, x = \frac{\pi}{4}, x = \frac{3\pi}{4}$

4) $y = 4, y = \frac{1}{x}, x = 5$

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

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

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

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

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

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

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

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

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

12) $y = 6$, $y = \sqrt{x}$, $x = 0$, $x = 1$



Answers to Assignment: Volume of Revolution-2

$$1) \pi \int_{\frac{\pi}{2}}^{\frac{3\pi}{4}} \csc^2 y \, dy$$

$$= \pi \approx 3.142$$

$$2) \pi \int_{-\frac{\pi}{3}}^0 (2 \sec y)^2 \, dy$$

$$= 4\sqrt{3} \cdot \pi \approx 21.766$$

$$3) \pi \int_{\frac{\pi}{4}}^{\frac{3\pi}{4}} ((2 \csc x)^2 - \csc^2 x) \, dx$$

$$= 6\pi \approx 18.85$$

$$4) \pi \int_{\frac{1}{4}}^5 \left(4^2 - \left(\frac{1}{x}\right)^2\right) \, dx$$

$$= \frac{361}{5}\pi \approx 226.823$$

$$5) \pi \int_0^1 ((x^2 + 3)^2 - 2^2) \, dx$$

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

$$6) \pi \int_{-2}^{-1} ((-x^2 + 7)^2 - (x + 5)^2) \, dx$$

$$= \frac{51}{5}\pi \approx 32.044$$

$$7) \pi \int_{-2}^2 (-y^2 + 4)^2 \, dy$$

$$= \frac{512}{15}\pi \approx 107.233$$

$$8) \pi \int_0^2 (-y^2 + 4)^2 \, dy$$

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

$$9) \pi \int_{-2}^2 ((-x^2 + 5)^2 - 1) \, dx$$

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

$$10) \pi \int_{-1}^2 ((-x^2 + 6)^2 - (-x + 4)^2) \, dx$$

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

$$11) \pi \int_0^1 ((-x^2 + 2)^2 - 1) \, dx$$

$$= \frac{28}{15}\pi \approx 5.864$$

$$12) \pi \int_0^1 (6^2 - (\sqrt{x})^2) \, dx$$

$$= \frac{71}{2}\pi \approx 111.527$$