

CALCULUS BC
WORKSHEET ON VOLUME BY DISCS

Work the following on **notebook paper**. Use your calculator only on problems 7 – 9.

On problems 1 and 2, find the volume of the solid obtained by rotating the region bounded by the given curves about the specified axis. Sketch the region, the solid, and a representative cylinder.

1. $y = x^2$, $x = 1$, $y = 0$ about the x -axis
2. $y = x^2$, $y = 4$, $x = 0$, $x = 2$ about the y -axis

On problems 3 and 4, draw the figure, and set up the integral needed to find the volume when the given curve is rotated about the specified axis. **Do not evaluate the integrals.**

3. $y = 4 - x^2$, $x = 0$, $x = 2$, $y = 0$

- (a) about the x -axis
- (b) about the line $y = 5$
- (c) about the y -axis
- (d) about the line $x = -3$

4. $y = 2x^2$, $y = 0$, $x = 0$, $x = 2$

- (a) about the x -axis
- (b) about the y -axis
- (c) about the line $x = 2$
- (d) about the line $y = 8$

On problems 5 – 9, draw the figure, set up the integral needed to find the volume when the given curve is rotated about the specified axis, and **find the answer.**

Use your calculator on problems 7 – 9 only.

5. $y = x$, $y = x^2$ about the x -axis
6. $y = x^3$, $y = 8$, $x = 0$ about the y -axis
7. $y = 6 - 2x - x^2$ and $y = x + 6$ about the line $y = 3$
8. $y = x^2$ and $y = \ln(x + 1)$ about the x -axis
9. $y = 3 \sin(x^2)$ and $y = e^{x/2} + e^{-2x}$ about the x -axis