7.3 Volume By Washers

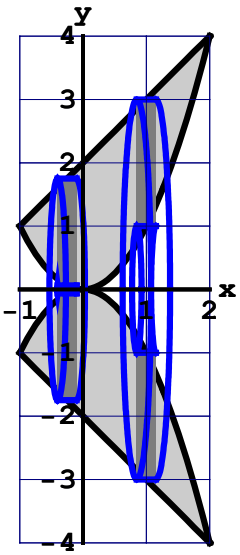
$$V_{washer} = \pi((\text{outer radius})^2 - (\text{inner radius})^2)(\text{thickness})$$

x – axis $\quad V_{washer} = \pi \int_a^b ((f(x))^2 - (g(x))^2)\,dx$ where $f(x)$ is the outer radius and $g(x)$ is the inner radius

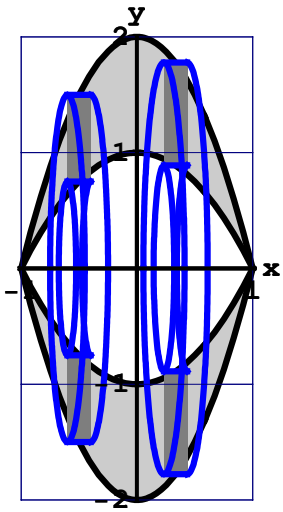
y – axis $\quad V_{washer} = \pi \int_c^d ((f(y))^2 - (g(y))^2)\,dy$ where $f(y)$ is the outer radius and $g(y)$ is the inner radius

For problems 1 – 8, find the volume of the indicated solid.

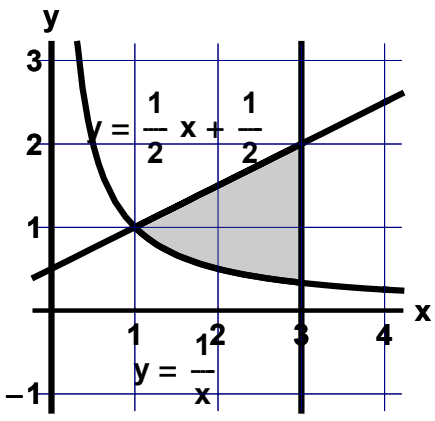
1. $y = x + 2$, $y = x^2$, rotated around the x – axis



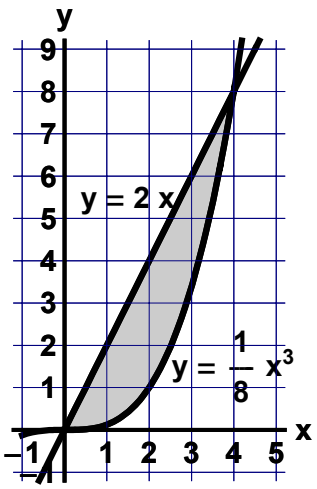
2. $y = 2 - 2x^2$, $y = 1 - x^2$, rotated around the x – axis



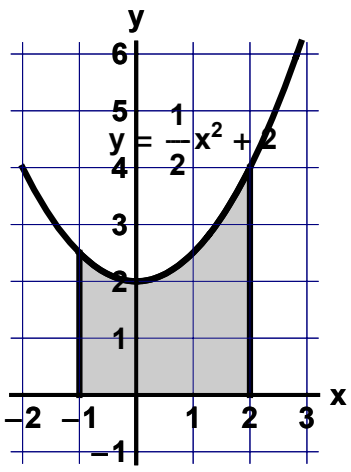
3. $y = \frac{1}{2}x + \frac{1}{2}$, $y = \frac{1}{x}$, and $x = 3$, rotated around the x – axis



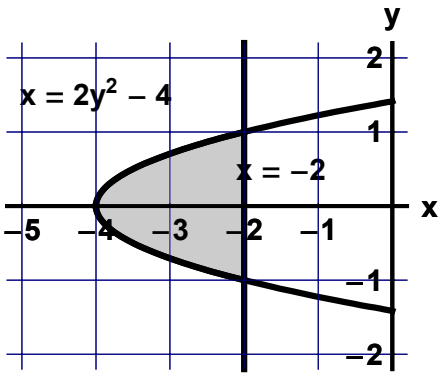
4. $y = 2x$, $y = \frac{1}{8}x^3$, rotated around the y – axis



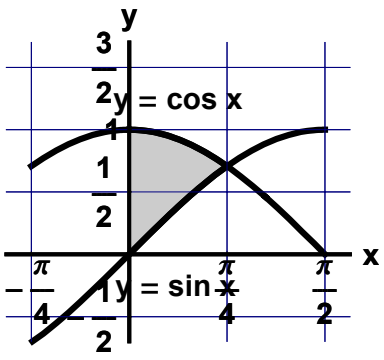
5. $y = \frac{1}{2}x^2 + 2$, $y = 0$, $x = -1$, $x = 2$, rotated around the x – axis



6. $x = 2y^2 - 4$, $x = -2$, rotated around the y – axis



7. $y = \cos x$, $y = \sin x$, $x = 0$, $x = \frac{\pi}{4}$, rotated around the x – axis



8. $x = y^{\frac{2}{3}}$, $x - y = 2$, and $y = 8$, rotated around the y – axis