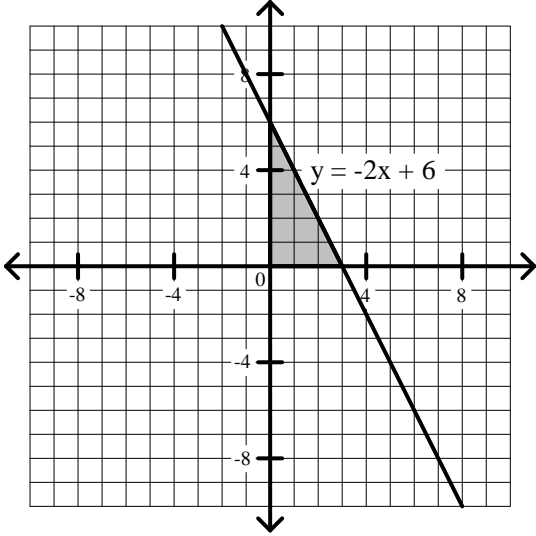# Calculus   Worksheet #8   Unit 3   Selected Solutions

3. the region bounded by the x-axis, the y-axis, and the line $2x + y = 6$
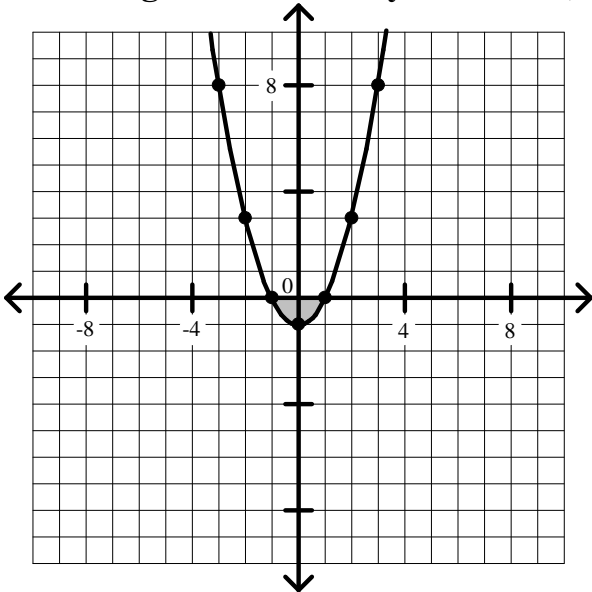

$$V = \pi\int_{0}^{3}(-2x+6)^2\,dx = \pi\int_{0}^{3}(4x^2 - 24x + 36)\,dx =$$

$$V = \pi\left(\tfrac{4}{3}x^3 - 12x^2 + 36x\right)\Big|_{0}^{3} =$$

$$V = \pi[(36 - 108 + 108) - (0)] =$$

$$V = 36\,\pi \approx 113 \text{ cubic units}$$

4. the region bounded by the x-axis, the y-axis, and the curve $y = x^2 - 1$

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

$$V = \pi\left(\tfrac{1}{5}x^5 - \tfrac{2}{3}x^3 + x\right)\Big|_{-1}^{1} =$$

$$V = \pi[(\tfrac{1}{5} - \tfrac{2}{3} + 1) - (\tfrac{-1}{5} + \tfrac{2}{3} - 1)] =$$

$$V = \pi\left(\tfrac{8}{15} - \tfrac{-8}{15}\right) =$$

$$V = \tfrac{16\pi}{15} \approx 3.35 \text{ cubic units}$$