

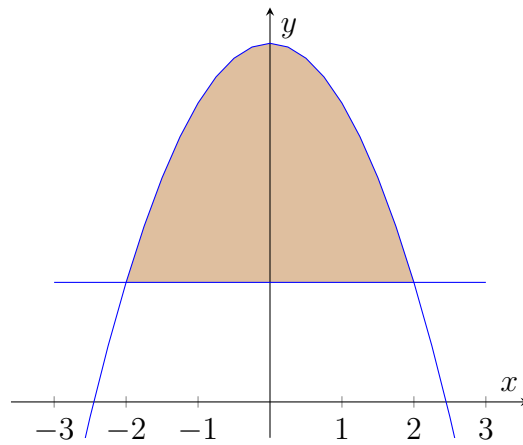
Section 6.2

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Calculus II: August 2016 - December 2016

Problem 8

$$y = 6 - x^2 \quad y = 2$$



$$V = \int A dx$$

$$V = \int \pi(R1)^2 - (R2)^2 dx$$

$$V = \pi \int_{-2}^2 (6 - x^2)^2 - (2)^2 dx$$

$$V = \pi \int_{-2}^2 36 - 12x^2 + x^4 - 4 dx$$

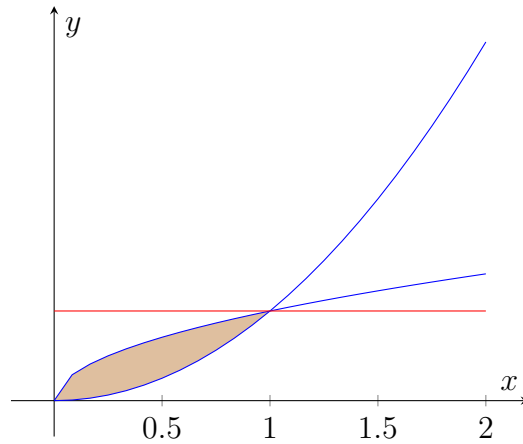
$$V = \pi \int_{-2}^2 x^4 - 12x^2 + 32 dx$$

$$V = \pi \left[\frac{x^5}{5} - \frac{12x^3}{3} + 32x \right]_{-2}^2$$

$$V = \frac{384\pi}{5}$$

Problem 11

$$y = x^2 \quad x = y^2$$



$$V = \int A dx$$

$$V = \int \pi(R1)^2 - (R2)^2 dx$$

$$V = \pi \int_0^1 (1 - x^2)^2 - (1 - \sqrt{x})^2 dx$$

$$V = \pi \int_0^1 (1 - 2x^2 + x^4) - (1 - 2\sqrt{x} + x) dx$$

$$V = \pi \int_0^1 x^4 - 2x^2 - x + 2\sqrt{x} dx$$

$$V = \pi \left[\frac{x^5}{5} - \frac{2x^3}{3} - \frac{x^2}{2} + \frac{4x^{3/2}}{3} \right]_0^1$$

$$V = \frac{11\pi}{30}$$

Problem 17

$$x = y^2 \quad x = 1 - y^2$$

about $x = 3$.

$$V = \int A dy$$

$$V = \int \pi(R1)^2 - (R2)^2 dy$$

$$\begin{aligned}
 V &= \pi \int_{-2\sqrt{2}}^{2\sqrt{2}} (3 - y^2)^2 - (3 - (1 - y^2))^2 dy \\
 V &= \pi \int_{-2\sqrt{2}}^{2\sqrt{2}} (9 - 6y^2 + y^4) - (y^4 + 4y^2 + 4)^2 dy \\
 V &= \pi \int_{-2\sqrt{2}}^{2\sqrt{2}} 5 - 10y^2 dy \\
 V &= \pi \left[10y - \frac{10y^3}{3} \right]_{-2\sqrt{2}}^{2\sqrt{2}} \\
 V &= \frac{10\pi\sqrt{2}}{3}
 \end{aligned}$$

Problem 29

$$\begin{aligned}
 x &= 1 - y^2 & x &= 1 - y \\
 V &= \int A dy \\
 V &= \int \pi(R1)^2 - (R2)^2 dy \\
 V &= \pi \int_0^1 (1 - y^2)^2 - (1 - y)^2 dy \\
 V &= \pi \int_0^1 1 - 2y^4 + y^8 - (1 - 2y + y^2) dy \\
 V &= \pi \int_0^1 y^8 - 2y^4 - y^2 + 2y dy \\
 V &= \pi \left[\frac{y^9}{9} - \frac{2y^5}{5} - \frac{y^3}{3} - \frac{2y^2}{2} \right]_0^1 \\
 V &= \frac{17\pi}{45}
 \end{aligned}$$

Problem 55

$$\begin{aligned}
 \frac{x^2}{2} + \frac{y^2}{9} &= 1 \\
 y &= \sqrt{36 - 9x^2} \\
 V &= \int A dx \\
 V &= \int \pi r^2 dx
 \end{aligned}$$

$$V = \pi \int_{-2}^2 (\sqrt{36 - 9x^2})^2 dx$$

$$V = \pi \int_{-2}^2 36 - 9x^2 dx$$

$$V = \pi \left[36x - \frac{9x^3}{3} \right]_{-2}^2$$

$$V = 24\pi$$

If any errors are found, please contact me at alvin.lin.dev@gmail.com