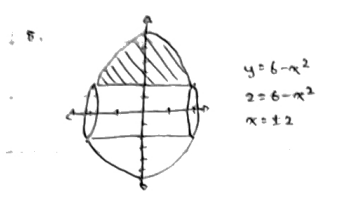


Math Homework 5.1B

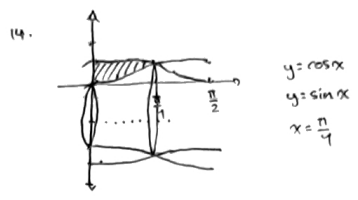


$$\int_{-2}^2 \pi [(6-x^2)^2 - 2^2] dx$$

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

$$= \pi \left[\frac{1}{5}x^5 - 4x^3 + 32x \right]_{-2}^2$$

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



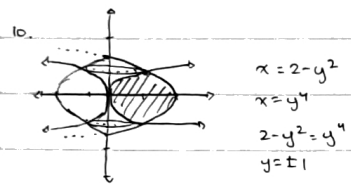
$$\int_0^{\pi/4} \pi [(1+\cos x)^2 - (1+\sin x)^2] dx$$

$$= \pi \int_0^{\pi/4} (\cos^2 x + 2\cos x + 1 - \sin^2 x + 2\sin x - 1) dx$$

$$= \pi \int_0^{\pi/4} (\cos^2 x + 2\cos x - \sin^2 x + 2\sin x) dx$$

$$= \pi \left[\frac{1}{2}\sin 2x + 2\sin x + 2\cos x \right]_0^{\pi/4}$$

$$= \pi \left(2\sqrt{2} - \frac{3}{2} \right)$$

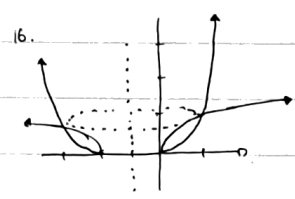


$$\int_{-1}^1 \pi [(2-y^2)^2 - (y^4)^2] dy$$

$$= \pi \int_{-1}^1 (4-4y^2+y^4-y^8) dy$$

$$= \pi \left[4y - \frac{4}{3}y^3 + \frac{1}{5}y^5 - \frac{1}{9}y^9 \right]_{-1}^1$$

$$= \frac{248\pi}{45}$$

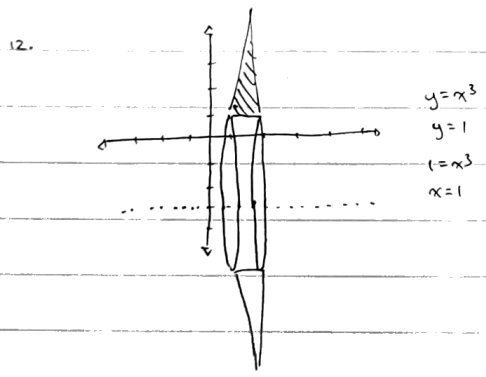


$$\int_0^1 \pi [(1+y)^2 - (1+y^2)^2] dy$$

$$= \pi \int_0^1 (-y^4 - 2y^2 + y + 2 + 2\sqrt{y}) dy$$

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

$$= \frac{29\pi}{30}$$

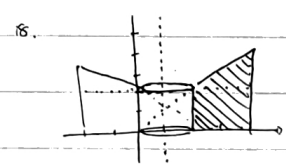


$$\int_1^4 \pi [(x^3+3)^2 - 4^2] dx$$

$$= \pi \int_1^4 (x^6 + 6x^3 - 7) dx$$

$$= \pi \left[\frac{1}{7}x^7 + \frac{3}{2}x^4 - 7x \right]_1^4$$

$$= \frac{471\pi}{14}$$



$$\int_0^2 \pi [(4-y)^2 - (2-y)^2] dy + \int_2^4 \pi [(4-y)^2 - (y-1)^2] dy$$

$$= 16\pi + \pi \left[-\frac{1}{3}y^3 + y^2 + 8y \right]_2^4$$

$$= 16\pi + \frac{28\pi}{3}$$

$$= \frac{76\pi}{3}$$

$$32. a. \int_{-\pi/4}^{\pi/4} \pi \left[(\cos^2 x)^2 \right] dx$$

$$= \underline{3.7011}$$

$$b. \int_{-\pi/4}^{\pi/4} \pi \left[1 - (1 - \cos^2 x)^2 \right] dx$$

$$= \underline{6.1685}$$

$$34. a. \frac{1}{2} \quad y = x^2 ; x^2 + y^2 = 1$$

$$y^2 = 1 - x^2 \quad x = \sqrt{1 - y^2}$$

$$y = \sqrt{1 - x^2}$$

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

$$x^4 = 1 - x^2$$

$$0 = x^4 + x^2 - 1$$

$$x = \sqrt{\frac{-1 \pm \sqrt{5}}{2}}$$

$$\int_{\sqrt{\frac{-1-\sqrt{5}}{2}}}^{\sqrt{\frac{-1+\sqrt{5}}{2}}} \pi \left[(\sqrt{1-x^2})^2 - (x^2)^2 \right] dx$$

$$= \underline{3.544}$$

$$b. y = \frac{-1 + \sqrt{5}}{2}$$

$$\int_{\frac{-1-\sqrt{5}}{2}}^1 \pi \left((1 - \sqrt{y})^2 \right) dy + \int_0^{\frac{-1+\sqrt{5}}{2}} \pi y^2 dy$$

$$= \underline{0.999}$$