4. $y = x^2 + 1$ dan $y = -x^2 + 3$

$$L = \int_{-1}^{1} [(-x^2 + 3) - (x^2 + 1)] \, dx$$

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

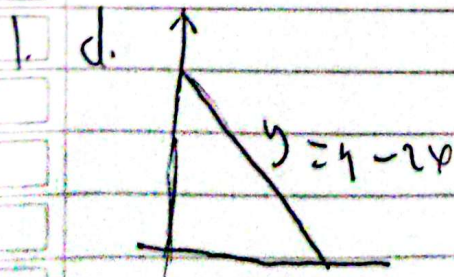$$= \int_{-1}^{1} -2x^2 \, dx + \int_{-1}^{1} 2 \, dx$$

$$\int_{-1}^{1} -2x^2 \, dx = \frac{-2x^3}{3}$$

$$= \left[-\frac{2x^3}{3} \right]_{-1}^{1} = -\frac{2(1)^3}{3} - \left(-\frac{2(-1)^3}{3} \right) = -\frac{4}{3}$$

$$\int_{-1}^{1} 2 \, dx = 2x$$

$$= [2x]_{-1}^{1} = 2(1) - 2(-1) = 4$$

$$L = -\frac{4}{3} + 4 = -\frac{4}{3} + \frac{12}{3} = \frac{8}{3}$$

1. d.

$y = 4 - 2x$

Volume benda putar jika diputar mengelilingi sumbu -x

$$V = \pi \int_{x=a}^{b} [f(x)]^2 \, dx$$

$$V = \pi \int_0^2 (4 - 2x)^2 \, dy$$

$$V = \pi \int_0^2 (16 - 16x + 4x^2) \, dy = 16x - 8x^2 + \frac{4}{3}x^3$$

$$V = \pi \left[16x - 8x^2 + \frac{4}{3}x^3 \right]_0^2$$

$$V = \pi \left[\left(16(2) - 8(2)^2 + \frac{4}{3}(2)^3 \right) - \left(16(0) - 8(0)^2 + \frac{4}{3}(0)^3 \right) \right]$$

$$V = \pi \left[\left(32 - 32 + \frac{32}{3} \right) - 0 \right]$$

$$V = \pi \left(\frac{32}{3} \right) = \frac{32\pi}{3}$$

Volume benda putar jika diputar mengelilingi sumbu y

$$y = 4 - 2x$$
$$2x = 4 - y$$
$$x = \frac{4 - y}{2}$$

$$V = \pi \int_{y=4}^b [g(y)]^2 \, dy$$

$$V = \pi \int_0^4 \left(\frac{4 - y}{2} \right)^2 \, dy$$

$$V = \pi \int_0^4 \frac{(4 - y)^2}{4} \, dy$$

$$V = \frac{\pi}{4} \int_0^4 (4-y)^2 \, dy$$

$$V = \frac{\pi}{4} \int_0^4 (16 - 8y + y^2) \, dy = 16y - 4y^2 + \frac{y^3}{3}$$

$$V = \frac{\pi}{4} \left[16y - 4y^2 + \frac{y^3}{3} \right]_0^4$$

$$V = \frac{\pi}{4} \left[\left(16(4) - 4(4)^2 + \frac{(4)^3}{3} \right) - \left(16(0) - 4(0)^2 + \frac{(0)^3}{3} \right) \right]$$

$$V = \frac{\pi}{4} \left[\left(64 - 64 + \frac{64}{3} \right) - 0 \right]$$

$$V = \frac{\pi}{4} \left(\frac{64}{3} \right) = \frac{16\pi}{3}$$