

Name:

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Math 2B: Quiz 3

Find the volume generated from the following region \mathcal{R} rotated about the following line.

$$\mathcal{R} = \{f(x) = 2 - x, y = 0, x = 0\}$$

(5) **1.** x -axis

$$r = 2 - x \Rightarrow \pi \int_0^2 (2 - x)^2 dx = \pi \int_0^2 x^2 - 4x + 4 = \pi \left[\frac{x^3}{3} - 2x^2 + 4x \right]_0^2 = \frac{8\pi}{3}$$

(5) **2.** $x = 3$

$$r_1 = 3, r_2 = 3 - (2 - y) = 1 + y$$

$$\Rightarrow \pi \int_0^2 (3)^2 dy - \pi \int_0^2 (1 + y)^2 dy = 18\pi - \pi \left[\frac{y^3}{3} + y^2 + y \right]_0^2 = 18\pi - \frac{26\pi}{3} = \frac{28\pi}{3}$$