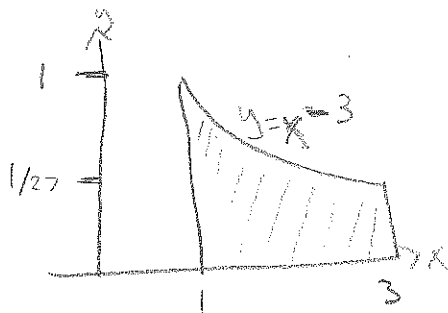


Please work alone, and keep your eyes on your own paper. Show *all* work to receive full credit (including the appropriate antiderivatives).

1. (20 points) Sketch the region R bounded by $y = x^{-3}$, $x = 1$, $x = 3$, and $y = 0$. Then, set up, but *do not evaluate* integrals for each of the following. You *must* indicate which method you use for each volume to receive full credit.



- (a) Area of R .

$$A = \int_1^3 x^{-3} dx$$

- (b) Volume of the solid obtained when R is revolved about the y -axis.

• With vertical slices
use shell method

$$V = 2\pi \int_1^3 x(x^{-3}) dx$$

• With horizontal slices
use washer method

$$V = \pi \left[\int_0^{1/27} [3^2 - r^2] dy + \int_{1/27}^1 [(y^3)^2 - 1^2] dy \right]$$

Quiz #1

(c) Volume of the solid obtained when R is revolved about the line $y = -1$.

With vertical slices
use washer method

$$V = \pi \int_1^3 [(x^{-3} + 1)^2 - (1)^2] dx$$

with horizontal slices
use shell method

$$V = 2\pi \left[\int_{1/27}^1 y(y^3 - 1) dy + \int_0^{1/27} y(2) dy \right]$$

(d) Volume of the solid obtained when R is revolved about the line $x = 4$.

with vertical slices.
use shell method

$$V = 2\pi \int_1^3 (4-x)x^3 dx$$

with horizontal slices
use washer method

$$V = \pi \left[\int_{1/27}^1 [3^2 - (4-y^3)^2] dy + \int_0^{1/27} [3^2 - 1^2] dy \right]$$