Let R be the region in quadrant I and II enclosed by the graphs of $y_1 = 2 + \sin(x)$, $y_2 = \sec(x)$

a) Find the volume of a solid whose base is R and whose cross sections cut by planes perpendicular to the x-axis are squares.

$(2 + \sin x - \sec x)$ → side of a square

b) Find the volume of a solid whose base is R and whose cross sections cut by planes perpendicular to the x-axis are isosceles right triangles.

$(2 + \sin x - \sec x)$ → base of Δ

c) Find the volume of a solid whose base is R and whose cross sections cut by planes perpendicular to the x-axis are circles.

$(2 + \sin x - \sec x)$ → diameter

d) Find the volume of a solid whose base is R and whose cross sections cut by planes perpendicular to the x-axis are semi-circles.

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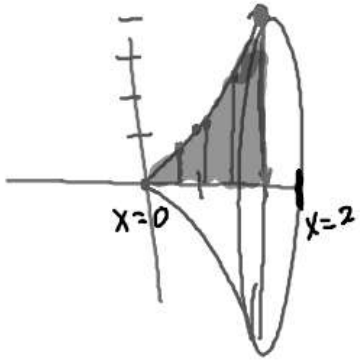
12. Find the volume of the solid generated by revolving the region bounded by the curve $y = x^2$ and the lines $y = 0$ and $x = 2$ about the x-axis.



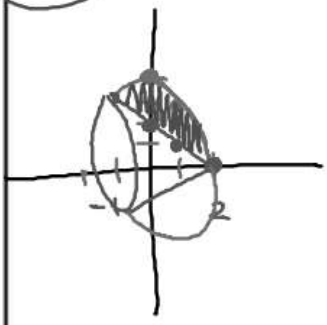
$$V = \int \pi r^2$$

$$r = x^2 - 0$$

$$V = \pi \int_0^2 (x^2)^2$$

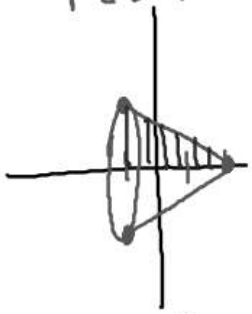
$$V = \pi \left[\frac{1}{5}x^5\right]_0^2 = \frac{32\pi}{5}$$

18. Find the volume of the solid generated by revolving the region bounded by the curve $y = 4 - x^2$ and the curve $y = 2 - x$ about the x-axis.



$r = 4 - x^2 - 0$

$r = 2 - x - 0$



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

Outter — Inner

Outer

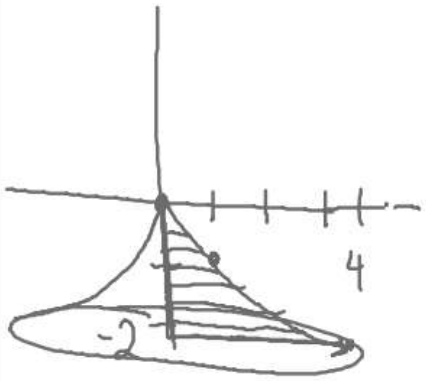
$$V = \pi \int_{-1}^{2} (4-x^2)^2 - (2-x)^2$$

$$V = \left((4-x^2) - (2-x)\right)^2$$

20. Find the volume of the solid generated by revolving the region bounded by the curve $y = -\sqrt{x}$ and the lines $x = 0$ and $y = -2$ about the y-axis.

y-axis

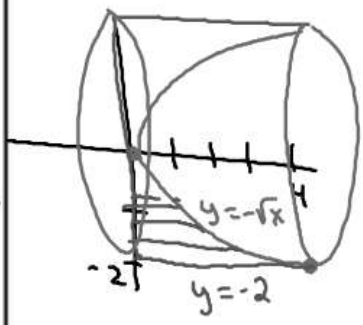
$y^2 = x$

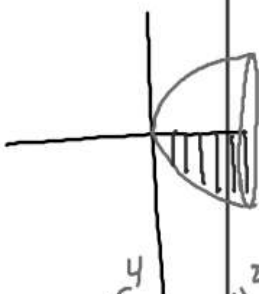


$$V = \pi \int_{-2}^{0} (y^2)^2$$

$r = y^2 - 0$

20. Find the volume of the solid generated by revolving the region bounded by the curve $y = -\sqrt{x}$ and the lines $x = 0$ and $y = -2$ about the x-axis.





$$V = \pi \int_{0}^{4} (0 - (-2))^2$$

$$V = \pi \int_{0}^{4} (0 - (-\sqrt{x}))^2$$

$$V = \pi \int_{0}^{4} (2)^2 - (\sqrt{x})^2 \, dx$$