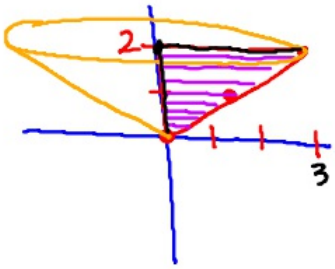
$V = \int (\text{area of shape})(\text{thickness})$

Using geometry, find the volume of the solid generated by revolving the region bounded by the curve $x = \frac{3y}{2}$ and the y-axis about the y-axis from $0 \le y \le 2$.

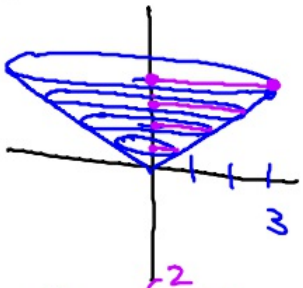


$V = \frac{1}{3}\pi r^2 h$

$V = \frac{1}{3}\pi (3)^2 (2)$

$V = 6\pi$

Using calculus, find the volume of the solid generated by revolving the region bounded by the curve $x = \frac{3y}{2}$ and the y-axis about the y-axis from $0 \le y \le 2$.



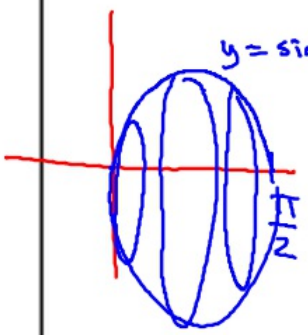
$V = \int (\text{area of shape})(\text{thickness})$

$V = \int_0^2 \pi r^2 \, dy$

$V = \int_0^2 \pi \left(\frac{3y}{2}\right)^2 dy$

$V = \frac{9}{4}\pi \int_0^2 y^2 \, dy = \frac{9}{4}\pi \left[\frac{1}{3}y^3\right]_0^2 = \frac{9}{4}\pi \left[\frac{8}{3}\right] = 6\pi$

10. Find the volume of the solid generated by revolving the region bounded by the curve **y = sinxcosx** and the x-axis about the x-axis from $0 \le x \le \frac{\pi}{2}$.

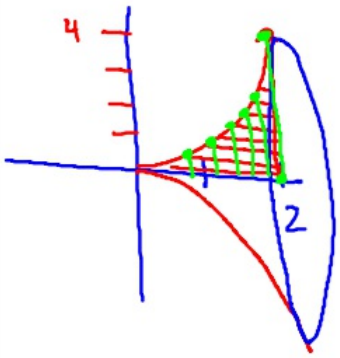


$V = \int_0^{\pi/2} \pi (\sin x \cos x)^2 \, dx$

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.

radius

x-axis



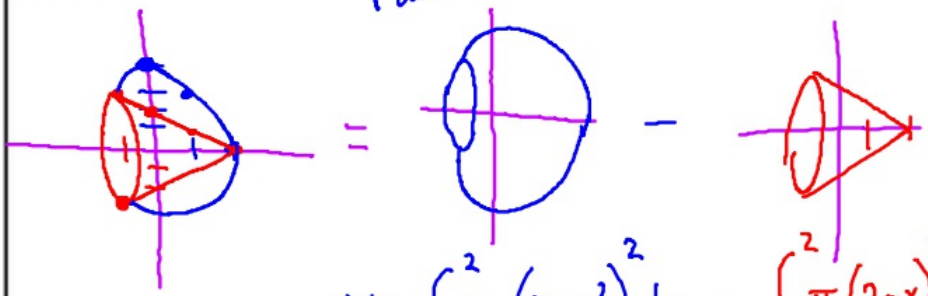
$$V = \int_0^2 \pi (x^2)^2 \, dx$$

$$V = \pi \int_0^2 x^4 \, dx$$

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

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.

radius



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

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

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

$$V = \pi \int_{-1}^{2} 16 - 8x^2 + x^4 - (4 - 4x + x^2)$$

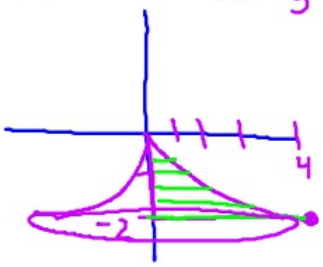
$$V = \pi \int_{-1}^{2} x^4 - 9x^2 + 4x + 12$$

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.

radius

y-axis

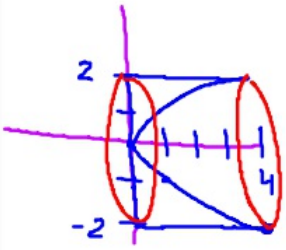
$x = y^2$

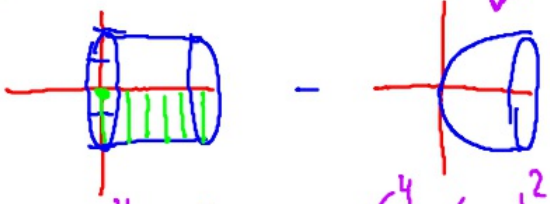


$$V = \int_{-2}^{0} \pi (y^2)^2 \, dy$$

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.

radius





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