In Exercises 35–38, use the cylindrical shell method to find the volume of the solid generated by revolving the region bounded by the curves about the y-axis.

35. $y = x, \quad y = -x/2, \quad x = 2 \quad 8\pi$

$-x+2$

36. $y = x^2, \quad y = 2 - x, \quad x = 0, \quad \text{for } x \geq 0 \quad 5\pi/6$

37. $y = \sqrt{x}, \quad y = 0, \quad x = 4 \quad 128\pi/5$

38. $y = 2x - 1, \quad y = \sqrt{x}, \quad x = 0 \quad 7\pi/15$

$2\pi r h$

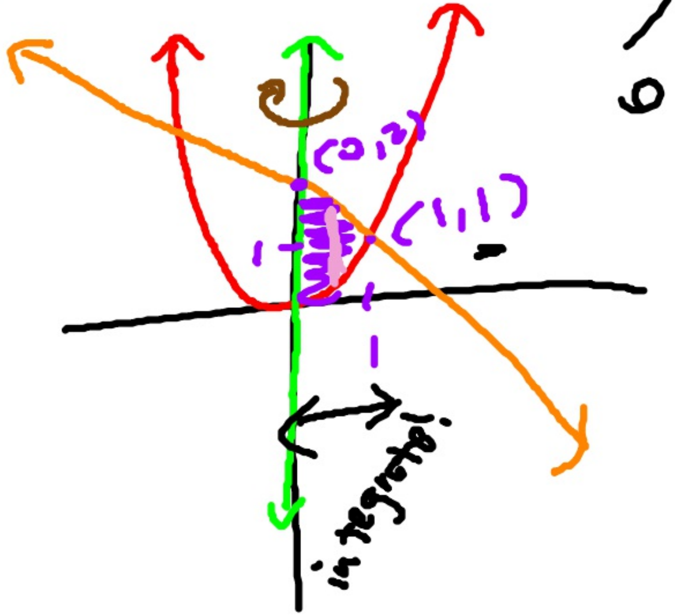
$r = x$

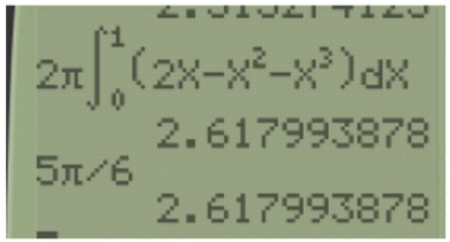
$h = (2-x) - x^2$

$2x - x^2 - x^3$

$$2\pi \int_0^1 (x)(2-x-x^2)\,dx$$

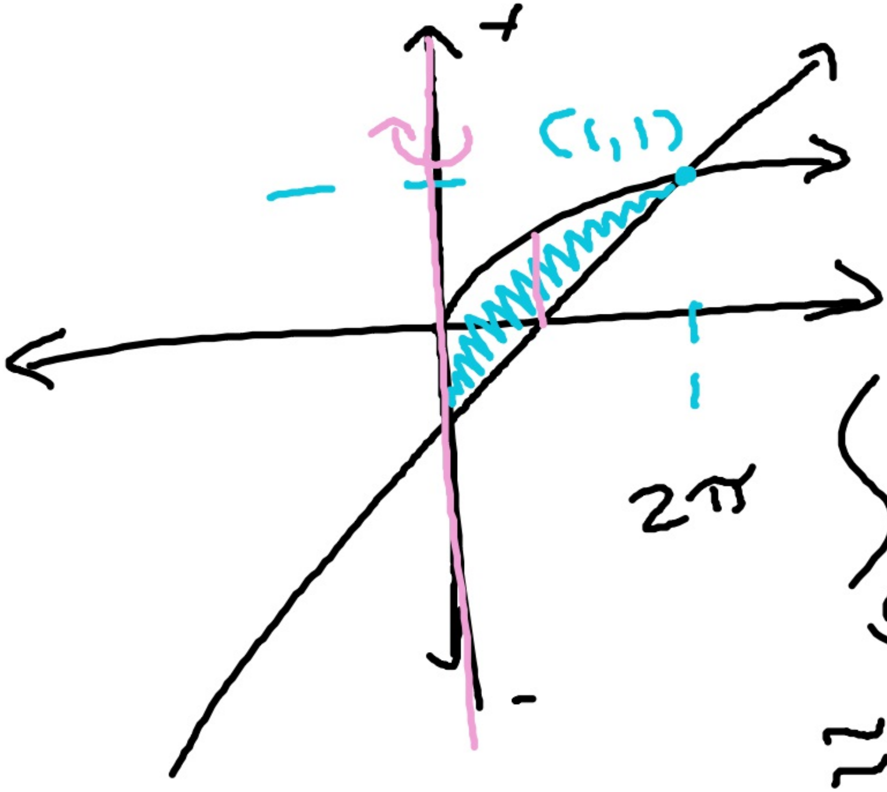
36





38. $y = 2x - 1, \quad y = \sqrt{x}, \quad x = 0$ $7\pi/15$

$2\pi \underline{r}\,\underline{h}$



$h = \sqrt{x} - (2x-1)$

$r = x$

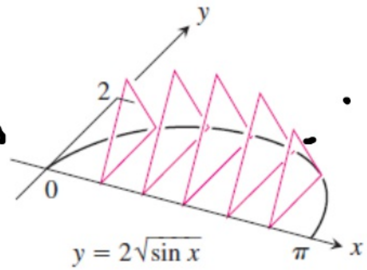
$2\pi \int_0^1 (x)(\sqrt{x} - 2x + 1)\,dx$

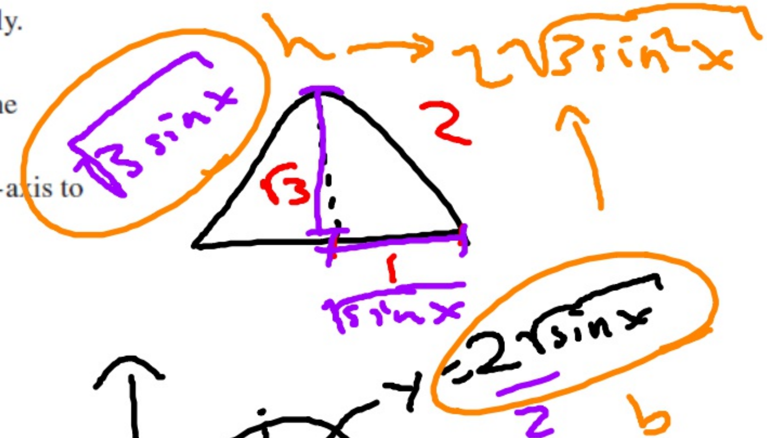
$\simeq 1.466$

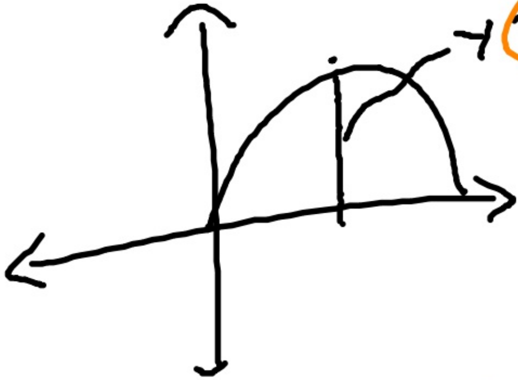
In Exercises 39–42, find the volume of the solid analytically.

39. The base of a solid is the region between the curve $y = 2\sqrt{\sin x}$ and the interval $[0, \pi]$ on the x-axis. The cross sections perpendicular to the x-axis are

(**a**) equilateral triangles with bases running from the x-axis to the curve as shown in the figure. $2\sqrt{3}$





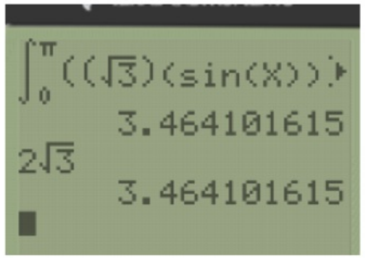


Create a Formula w/ one variable...

$A = \frac{1}{2} bh$

$= \frac{1}{2}\left(2\sin x(\sqrt{3})\right) = (\sin x)(\sqrt{3})$

$\int_0^{\pi} (\sqrt{3})(\sin x)$



$\int_0^{\pi}((\sqrt{3})(\sin(X))$

3.464101615

$2\sqrt{3}$

3.464101615

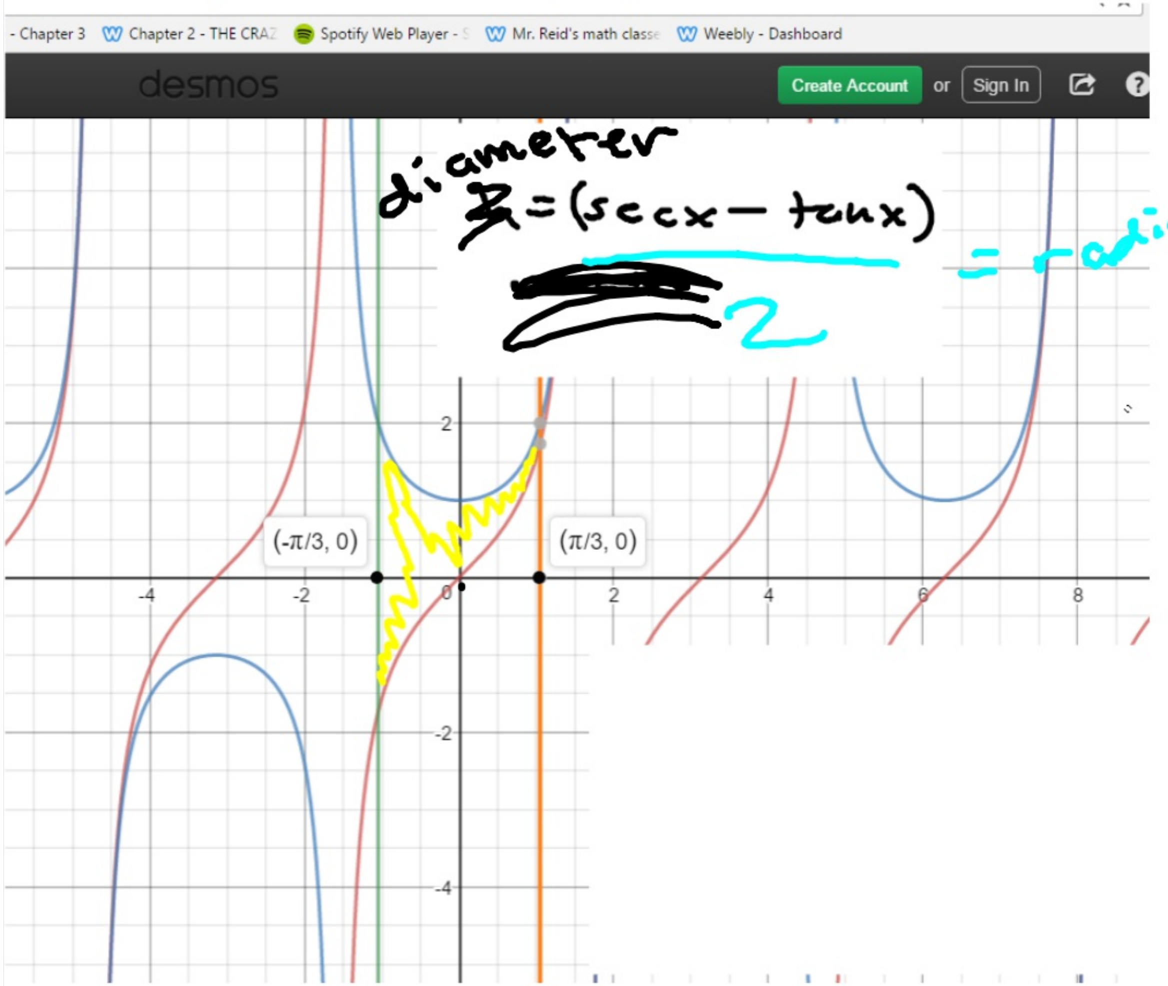
40. The solid lies between planes perpendicular to the x-axis at $x = -\pi/3$ and $x = \pi/3$. The cross sections perpendicular to the x-axis are

$A = \pi r^2$

(a) circular disks with diameters running from the curve $y = \tan x$ to the curve $y = \sec x$. $\pi\sqrt{3} - (\pi^2/6)$

(b) squares whose bases run from the curve $y = \tan x$ to the curve $y = \sec x$. $4\sqrt{3} - (2\pi/3)$

$$\int_{-\pi/3}^{\pi/3} \left(\frac{\sec x - \tan x}{2}\right)^2$$



diameter $= (\sec x - \tan x)$

$\dfrac{\sec x - \tan x}{2}$ = radius

40. The solid lies between planes perpendicular to the x-axis at $x = -\pi/3$ and $x = \pi/3$. The cross sections perpendicular to the x-axis are

(a) circular disks with diameters running from the curve $y = \tan x$ to the curve $y = \sec x$. $\pi\sqrt{3} - (\pi^2/6)$

(b) squares whose bases run from the curve $y = \tan x$ to the curve $y = \sec x$. $4\sqrt{3} - (2\pi/3)$

41. The solid lies between planes perpendicular to the y-axis at $y = 0$ and $y = 2$. The cross sections perpendicular to the y-axis are circular disks with diameters running from the y-axis to the parabola $x = \sqrt{5}y^2$. 8π

42. The base of the solid is the disk $x^2 + y^2 \leq 1$. The cross sections by planes perpendicular to the y-axis between $y = -1$ and $y = 1$ are isosceles right triangles with one leg in the disk. 8/3