Set up the integral, but do not evaluate the volume formed by $x = -y^2 + 4y$; $x = 0$, $y = 1$, about the y - axis.

$0 = -y^2 + 4y$

$y^2 - 4y = 0$

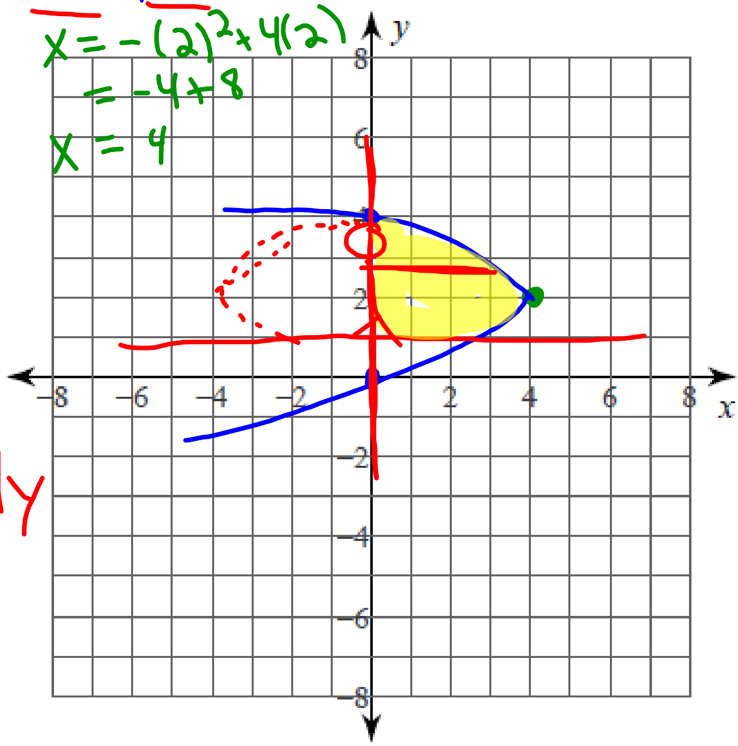
$y(y-4) = 0$

$y = 0, 4$

$x = -(2)^2 + 4(2)$

$= -4 + 8$

$x = 4$



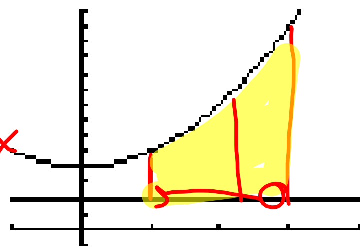
$$\pi \int_1^4 (-y^2 + 4y - 0)^2 \, dy$$

Warm-up (~~no calculator~~)

Find the volume obtained by revolving the region between $y = x^2 + 4$ and $y = 2$ about the $y = 2$ for

$1 \leq x \leq 3$

$$\pi \int_1^3 (x^2 + 4 - 2)^2 \, dx$$



NORMAL FLOAT AUTO REAL RADIAN MP

$\pi \int_1^3 ((Y_1 - Y_2)^2) dX$

286.094371

$\pi \int_1^3 ((Y_1 - Y_2)^2) dX$

286.094371

How much sugar will you get from a lifesaver?

Translated: What is the volume if the radius of the candy is 3cm, the radius of the hole in the middle is 1cm, and the height is 1cm?

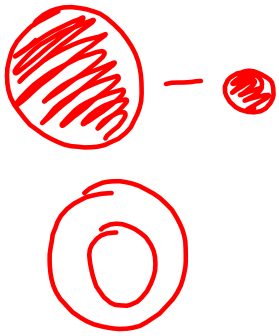
give answer in terms of π

Geometry:

$V = A_{base}*H$

$A_{base} = \pi R^2 - \pi r^2$

$V = \pi(R^2 - r^2)*H$



Calculus:

Stand and Deliver

Washer Method

7.2

for "ring" cross sections

Outer - Inner

Radius: Top - Bottom

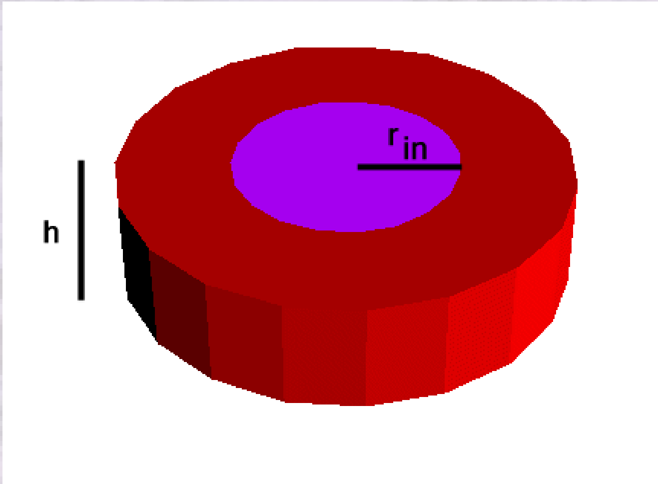
$$\pi\int_a^b (R(x))^2 - (r(x))^2\,dx$$

$$\pi\int_a^b (Top - Bottom)^2 - (Top - Bottom)^2\,dx$$

Radius: Right - Left

$$\pi\int_c^d (R(y))^2 - (r(y))^2\,dy$$

What is the volume of this washer like shape?



Find the volume of:

y = 6 - x, y = 0, y = 4, x = 0; about x = 6

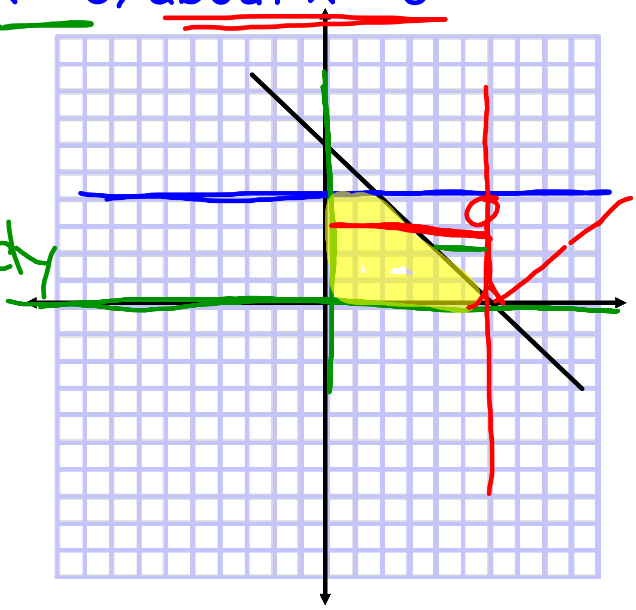
$x = 6 - y$

$$\pi\int_0^4 (6-0)^2 - (6-(6-y))^2 \, dy$$

$$(6-6+y)^2$$

$$\pi\int_0^4 36 - y^2 \, dy$$

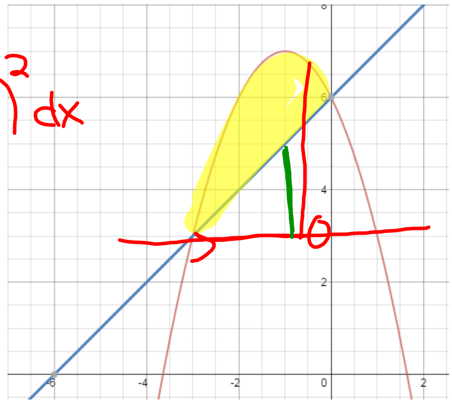
$$\pi\left(36y - \frac{y^3}{3}\right]_0^4$$



Find the volume of:

y = 6 - 2x - x²; y = x + 6 about y = 3

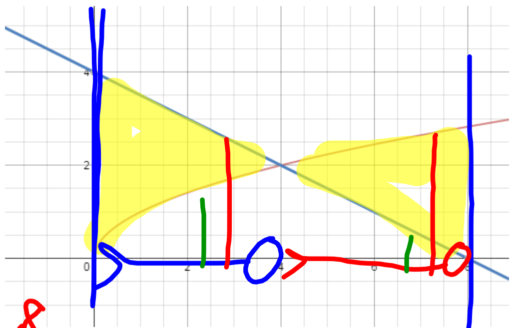
$$\pi\int_{-3}^{0}(6-2x-x^2-3)^2-(x+6-3)^2\,dx$$



$$6-2x-x^2=x+6$$
$$0=x^2+3x$$
$$0=x(x+3)$$
$$x=0,-3$$

Find the volume of the region between:

$y=\sqrt{x};\ y=-\frac{1}{2}x+4$; x = 0; x = 8 about x axis



$$\pi\int_{0}^{4}\left(-\tfrac{1}{2}x+4\right)^2-\left(\sqrt{x}\right)^2dx+\int_{4}^{8}\left(\sqrt{x}\right)^2-\left(-\tfrac{1}{2}x+4\right)^2dx$$

Volumes by Revolution.gsp

Volumes on Base.gsp