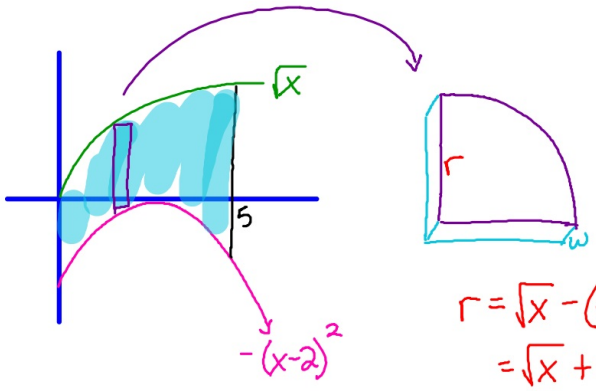
October 12

SWBAT:

Find the volume by slicing

The base of a solid lies between the curves $y = \sqrt{x}$, $y = -(x-2)^2$, $x = 0$ and $x = 5$ the cross-sections perpendicular to the x-axis are quarter-circles



$r = \sqrt{x} - (-(x-2)^2)$

$= \sqrt{x} + (x-2)^2$

$w = dx$

$A = \frac{1}{4}\pi r^2$

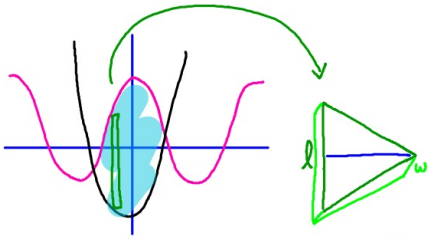
$= \frac{1}{4}\pi\left(\sqrt{x} + (x-2)^2\right)^2$

$V_{slice} = \frac{1}{4}\pi\left(\sqrt{x} + (x-2)^2\right)^2 dx$

$V_{total} = \int_0^5 \frac{1}{4}\pi\left(\sqrt{x} + (x-2)^2\right)^2 dx$

$= 84.793$

The base of a solid lies between the curves
$y = \cos x$ and
$y = x^2 - 4$
the cross-sections perpendicular to the x-axis are equilateral triangles



$$\ell = \cos x - (x^2 - 4)$$

$$A = \frac{1}{2}\ell^2 \sin(60^\circ)$$

$$= \frac{1}{2}\ell^2\left(\frac{\sqrt{3}}{2}\right) = \frac{\sqrt{3}}{4}\ell^2$$

$$A = \frac{\sqrt{3}}{4}\left(\cos x - (x^2-4)\right)^2$$

$$V_{slice} = \frac{\sqrt{3}}{4}\left(\cos x - (x^2-4)\right)^2 dx$$

$$V_{total} = \int_{-1.194}^{1.194} \frac{\sqrt{3}}{4}\left(\cos x - (x^2-4)\right)^2 dx$$

$$= 21.511$$