

November 14

SWBAT:

Find the volume by slicing



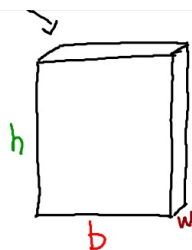
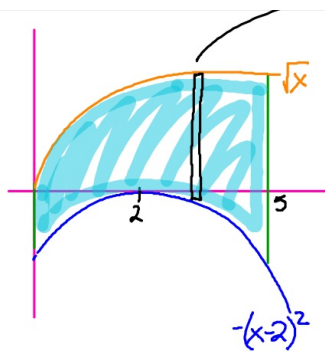
The base of a solid lies between the curves

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

$$x = 0 \text{ and } x = 5$$

the cross-sections perpendicular to the x-axis are

rectangles with base = $2h$



$h = \text{upper} - \text{lower}$

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

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

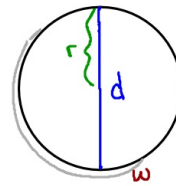
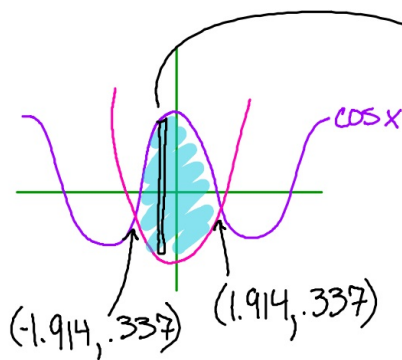
$$w = dx$$

$$\begin{aligned} \text{Area} &= bh = 2(\sqrt{x} + (x-2)^2)(\sqrt{x} + (x-2)^2) \\ &= 2(\sqrt{x} + (x-2)^2)^2 \end{aligned}$$

$$\begin{aligned} \text{Volume}_{\text{slice}} &= \text{Area} \cdot dx \\ &= 2(\sqrt{x} + (x-2)^2)^2 dx \end{aligned}$$

$$\text{Volume}_{\text{total}} = \int_0^5 2(\sqrt{x} + (x-2)^2)^2 dx = 215.924$$

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
circles



$$d = \text{upper} - \text{lower}$$

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

$$r = \frac{1}{2}(d) = \frac{1}{2}(\cos x - (x^2 - 4))$$

$$w = dx$$

$$\text{Area} = \pi r^2 = \pi \left(\frac{1}{2}(\cos x - (x^2 - 4)) \right)^2$$

$$\text{Volume}_{\text{slice}} = \text{Area} \cdot dx = \pi \left[\frac{1}{2}(\cos x - (x^2 - 4)) \right]^2 dx$$

$$V_{\text{Total}} = \int_{-1.914}^{1.914} \pi \left[\frac{1}{2}(\cos x - (x^2 - 4)) \right]^2 dx = 39.017$$