TEST QUESTION (no calculator)

In Exercises 11–14, find the volumes of the solids generated by revolving the regions bounded by the graphs of the equations about the given lines.

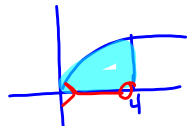
$y^2 = x$

11. $y = \sqrt{x}, \quad y = 0, \quad x = 4$

(a) the x-axis (b) the y-axis

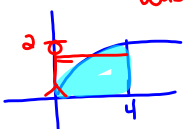
(c) the line $x = 4$ (d) the line $x = 6$

X-axis : Disk



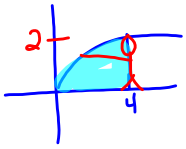
$\pi \int_0^4 (\sqrt{x})^2 dx$

Y-axis Washer



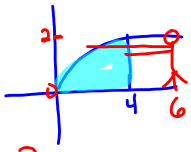
$\pi \int_0^2 (4-0)^2 - (y^2-0)^2 dy$

x=4 Disk



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

x=6 washer



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

Volume by Cross Section

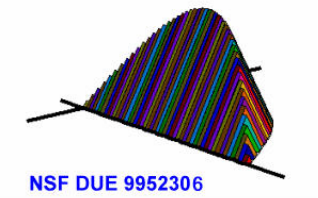
For cross sections of area A(x) taken perpendicular to the x-axis

$$V = \int_a^b A(x)dx$$

For cross sections of area A(y) taken perpendicular to the y-axis

$$V = \int_c^d A(y)dy$$

DEMOS with POSITIVE IMPACT.



NSF DUE 9952306

https://www.geogebra.org/m/XFgMaKTy

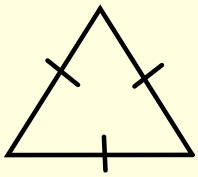
https://www.geogebra.org/m/v4sGHkRH

Volumes on Bas

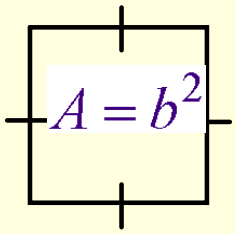
Stand and Deliver

Volume by Known Cross Section 7.2

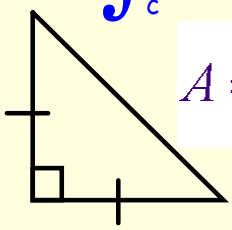
$\int_a^b A(x)dx$ $V = \int_c^d A(y)dy$



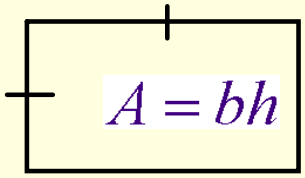
$A = \frac{\sqrt{3}}{4}s^2$



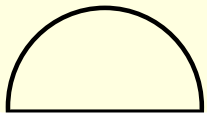
$A = b^2$



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



$A = bh$



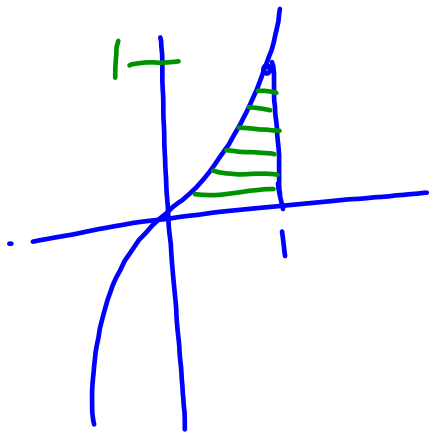
$A = \frac{1}{2}\pi r^2$

Base of a solid is bounded by $y = x^3$, $y = 0$, $x = 1$. $y^{1/3} = x$

Find the volume by taking perpendicular cross sections to the y axis using

a) squares

b) equilateral triangles



$\int A(y)\,dy$

$\int_0^1 (1 - y^{1/3})^2\,dy$

Attachments

Volumes by Revolution.gsp

Volumes on Base.gsp