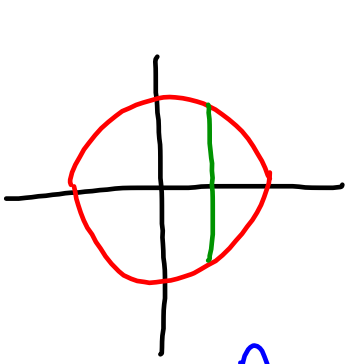
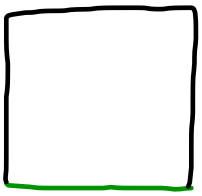
Find a formula for the area A(x) of the cross sections of the solid perpendicular to the x-axis.

1) The solid lies between planes perpendicular to the x-axis at $x = -2$ and $x = 2$. The cross sections perpendicular to the x-axis between these planes are squares whose bases run from the semicircle $y = -\sqrt{4 - x^2}$ to the semicircle $y = \sqrt{4 - x^2}$.

A) $4(4 - x^2)$ B) $2(4 - x^2)$ C) $2\sqrt{4 - x^2}$ D) $\sqrt{4 - x^2}$





Side $= 2\sqrt{4-x^2}$

$\sqrt{4-x^2} - (-\sqrt{4-x^2})$

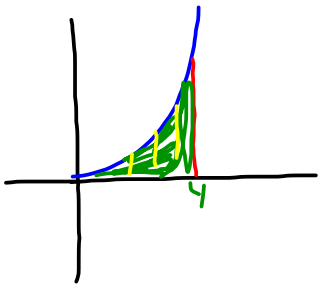
Area of square $= (2\sqrt{4-x^2})^2$

$= 4(4-x^2)$

Find the volume of the solid generated by revolving the region bounded by the given lines and curves about the x-axis.

2) $y = x^2, y = 0, x = 4$ 2) _____

A) 64π B) $\frac{1024}{5}\pi$ C) 256π D) $\frac{64}{3}\pi$



disks

r = y-value

$r = x^2$

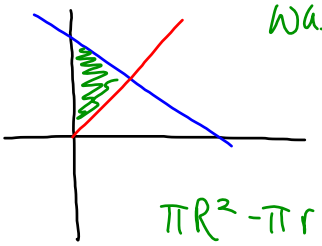
Area Disk $= \pi x^4$ $\pi(x^2)^2$

$\pi \int_0^4 x^4\,dx$ $\pi\left(\frac{1}{5}x^5\right)_0^4$

$\frac{1024\pi}{5}$

3) $y = -3x + 6$, $y = 3x$, $x = 0$

A) 18π B) 54π C) 6π D) 9π



Washers

$R = -3x+6$

$r = 3x$ $\quad -3x+6 = 3x$

$6 = 6x$

$x = 1$

$\pi R^2 - \pi r^2$

$\pi(-3x+6)^2 - \pi(3x^2)$

$\pi[9x^2 - 36x + 36 - 9x^2]$

$\pi \int_0^1 -36x + 36\,dx$

$\pi\left[-18x^2 + 36x\right]_0^1$

$\pi(-18+36) = 18\pi$

Find the volume of the solid generated by revolving the region about the given line.

4) The region in the first quadrant bounded above by the line $y = 3$, below by the line $y = \frac{3x}{2}$, and on the left by the y-axis, about the line $y = 3$

A) 6π B) 3π C) 4π D) 42π

Disks

$r = 3 - \frac{3x}{2}$

Area $= \pi\left(3 - \frac{3x}{2}\right)^2$

$3 = \frac{3x}{2}$

$6 = 3x$

$x = 2$

$= \pi\left(9 - 9x + \frac{9}{4}x^2\right)$

$V = \pi \int_0^2 9 - 9x + \frac{9}{4}x^2\,dx$

$= \pi\left[9x - \frac{9}{2}x^2 + \frac{3}{4}x^3\right]_0^2$

$V = \pi[18 - 18 + 6]$

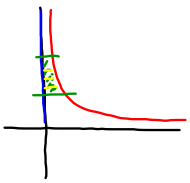
$= 6\pi$

Find the volume of the solid generated by revolving the region about the y-axis.

5) The region enclosed by $x = \frac{6}{y}$, $x = 0$, $y = 1$, $y = 2$

A) 54π B) 18π C) 3π D) 9π

$x = \frac{6}{y}$ $y = \frac{6}{x}$



Disks Radius = x-value

$\text{Radius} = \frac{6}{y}$

$\text{Area} = \pi\left(\frac{6}{y}\right)^2$

$\text{Area} = \pi\frac{36}{y^2}$

$36\pi\int_1^2 y^{-2}\,dy$

$36\pi\left[-y^{-1}\right]_1^2$

$36\pi\left[-\frac{1}{2} - -1\right]$

$36\pi\left(\frac{1}{2}\right) = 18\pi$