How do you find the volume of objects withs cross sections
A) $\perp$ to x-axis
B) $\perp$ to y-axis

A.) $\perp$ to x-axis
$\int_{x_1}^{x_2}$ Area of cross section dx

B.) $\perp$ to y-axis
$\int_{y_1}^{y_2}$ Area of cross section dy

What is the formula for finding volume if cross sections are A) Squares
B) Equilateral Δ
C) Rt. Isoceles Δ
d) Semi-Circle s=d
e) Semi-Circle s=r

Find the length of side
$dx \rightarrow$ top-bottom $dy \rightarrow$ Right-left

A) Square = $\int_{x_1}^{x_2} (side)^2 dx$ OR $\int_{y_1}^{y_2} (side)^2 dy$

B) Equilateral Triangle = $\frac{\sqrt{3}}{4}\int_{x_1}^{x_2} (side)^2 dx$ OR $\frac{\sqrt{3}}{4}\int_{y_1}^{y_2} (side)^2 dy$

C) Right Isoceles Triangle = $\frac{1}{2}\int_{x_1}^{x_2} (side)^2 dx$ OR $\frac{1}{2}\int_{y_1}^{y_2} (side)^2 dy$

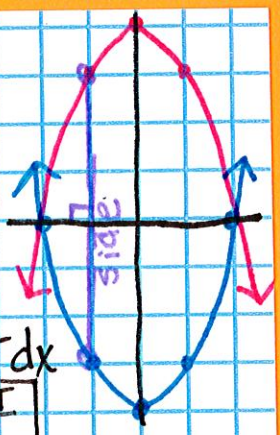
d) Semi-Circle = $\frac{\pi}{8}\int_{x_1}^{x_2} (side)^2 dx$ OR $\frac{\pi}{8}\int_{y_1}^{y_2} (side)^2 dy$
side = radius

side = diameter $\rightarrow \frac{\pi}{2}\int_{x_1}^{x_2} (side)^2 dx$ OR $\frac{\pi}{2}\int_{y_1}^{y_2} (side)^2 dy$

Find the volume of the object with base $y=x^2-4$ & $y=4-x^2$ with cross sections perpendicular to x-axis if cross sections are
A) Squares C) Equilateral Δ
B) Semi-Circle d) Rt Isoceles Δ

Base $y=x^2-4$ & $y=4-x^2$

$\perp$ to x $\Rightarrow$ side = top - bottom
side = $(4-x^2)-(x^2-4)$
side = $-2x^2+8$



A) Square
$\int_{-2}^{2}(-2x+8)^2 dx = \boxed{\frac{832}{3}}$

B) Semi-Circle
$\frac{\pi}{8}\int_{-2}^{2}(-2x^2+8)^2 dx = \boxed{\frac{104\pi}{3}}$

C) Equilateral Δ
$\frac{\sqrt{3}}{4}\int_{-2}^{2}(-2x+8)^2 dx = \boxed{\frac{208\sqrt{3}}{3}}$

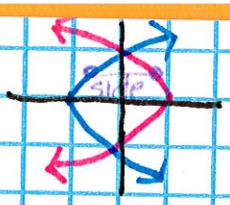
d) Rt Isoceles Triangle
$\frac{1}{2}\int_{-2}^{2}(-2x+8)^2 dx = \boxed{\frac{416}{3}}$

Find the volume of the object with base $x=1-y^2$ and $x=y^2-1$ with cross sections $\perp$ to the y-axis if cross sections are
A) squares
B) Isoceles Right Δ's
C) Equilateral Δ's
d) Semi-circles

Base $x=1-y^2$ $x=y^2-1$

$y^2=1-x$ $y^2=x+1$

$\boxed{\perp \text{ to } y}$ $y=\pm\sqrt{1-x}$ $y=\pm\sqrt{x+1}$



Side = right - left

Side $=(1-y^2)-(y^2-1)$

Side $=-2y^2+2$

A) square

$$\int_{-1}^{1}(-2y^2+2)^2\,dy=\boxed{\frac{64}{15}}$$

B) Isoceles Rt Δ

$$\frac{1}{2}\int_{-1}^{1}(-2y^2+2)^2\,dy$$

$$\boxed{\frac{32}{15}}$$

C) Equilateral Δ

$$\frac{\sqrt{3}}{4}\int_{-1}^{1}(-2y^2+2)^2\,dy$$

$$\boxed{\frac{16\sqrt{3}}{15}}$$

d) semi-circle

$$\frac{\pi}{8}\int_{-1}^{1}(-2y^2+2)^2\,dy$$

$$\boxed{\frac{\pi}{5}} \text{ OR } \frac{\pi}{2}\int_{-1}^{1}(1-y^2)^2\,dy$$