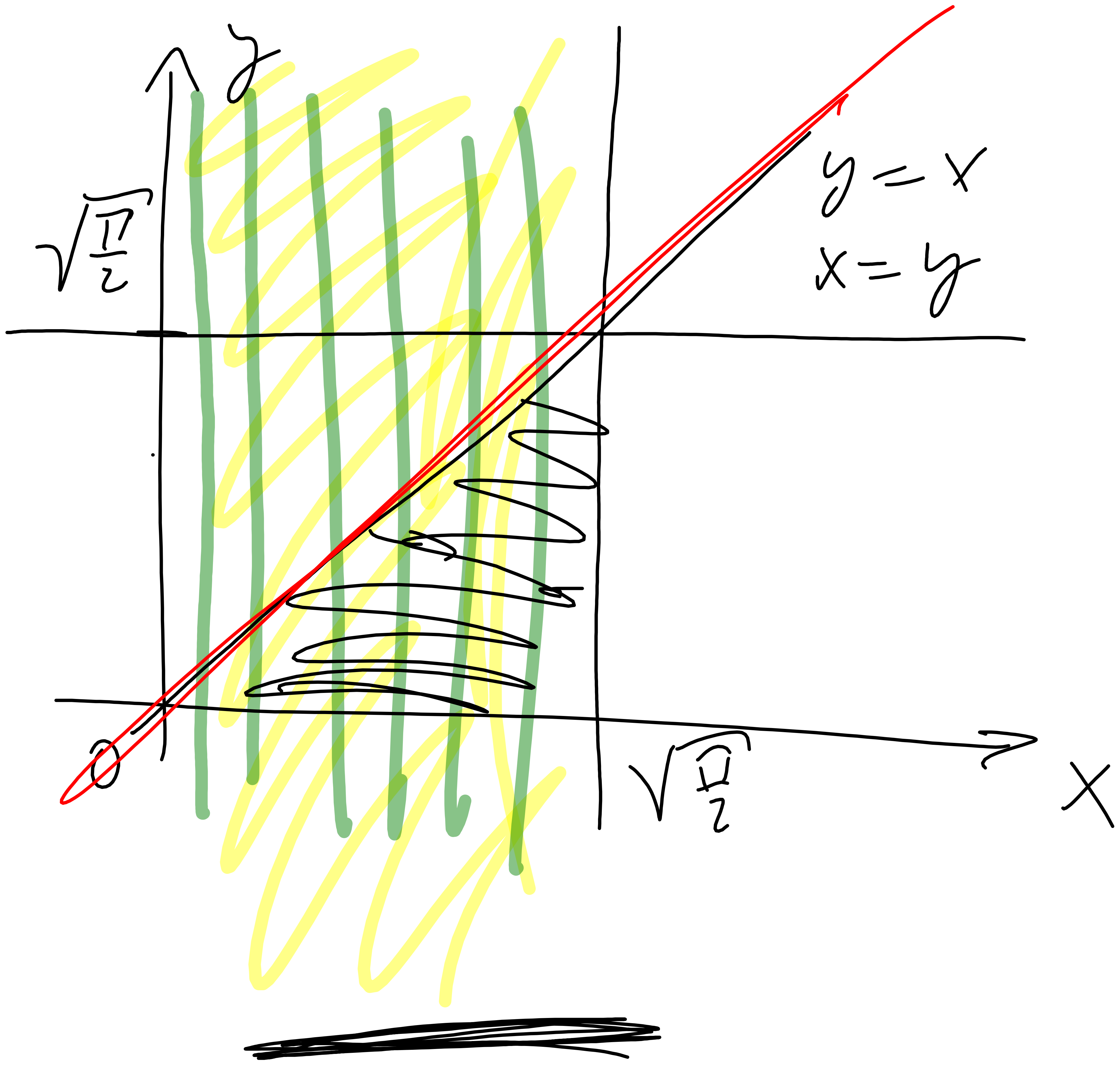
$$\int_1^\infty \frac{\sin x}{x}\,dx \Rightarrow \quad f(y) = \sin x, \quad g(x) = \frac{1}{x}$$

KONV. DLE D. K.

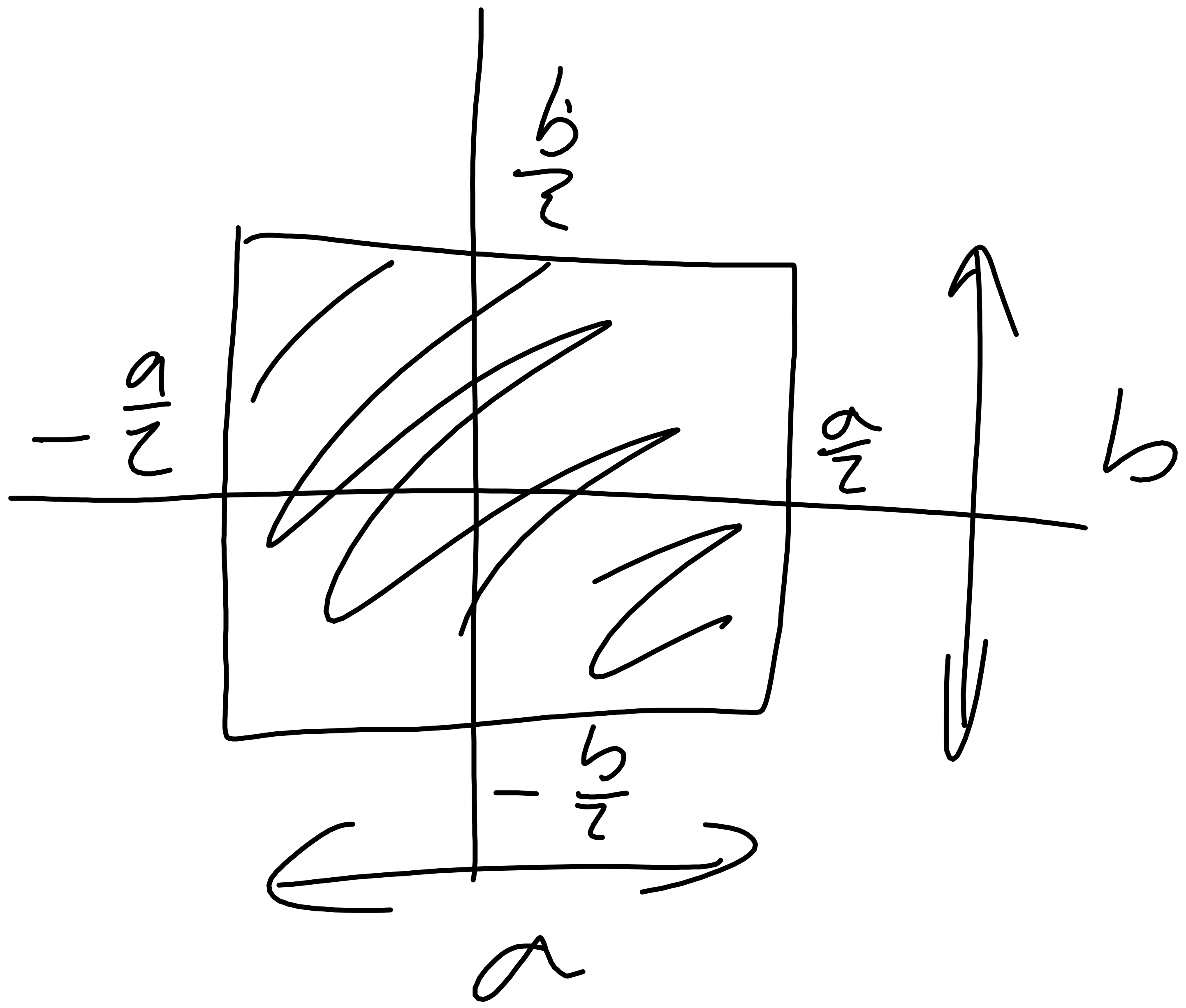
$$\int_1^\infty \underbrace{\frac{1-\cos 2x}{x}}_{\cancel{K}} + \underbrace{\frac{\cos 2x}{x}}_{\text{D.K.} \Rightarrow K \ \checkmark} \, dx = \int_1^\infty \underset{\cancel{K}}{\frac{1}{x}} \, dx$$



$y = x$

$$= \left| \begin{array}{l} \boxed{x^2 = t} \\ 2x\,dx = 1\,dt \\ x\,dx = \frac{1}{2}\,dt \end{array} \right| \begin{array}{l} x = \sqrt{\frac{\pi}{2}} \Rightarrow t = \frac{\pi}{2} \\ x = 0 \Rightarrow t = 0 \end{array} \left| = \frac{1}{3} \cdot \int_0^{\frac{\pi}{2}} t \cdot \sin t \cdot \frac{1}{2}\,dt \right.$$

$$= (P.P.) = \underline{\frac{1}{6}}$$



$$I = \iint_M y^2 \, dx \, dy =$$

$$= \int_{-\frac{a}{2}}^{\frac{a}{2}} \int_{-\frac{b}{2}}^{\frac{b}{2}} y^2 \, dy \quad dx = \ldots$$

$$\ldots = \frac{1}{12} a b^3$$

c) $a = b$

$I = \frac{1}{12} \cdot a^4$

$\frac{a^4}{12}$

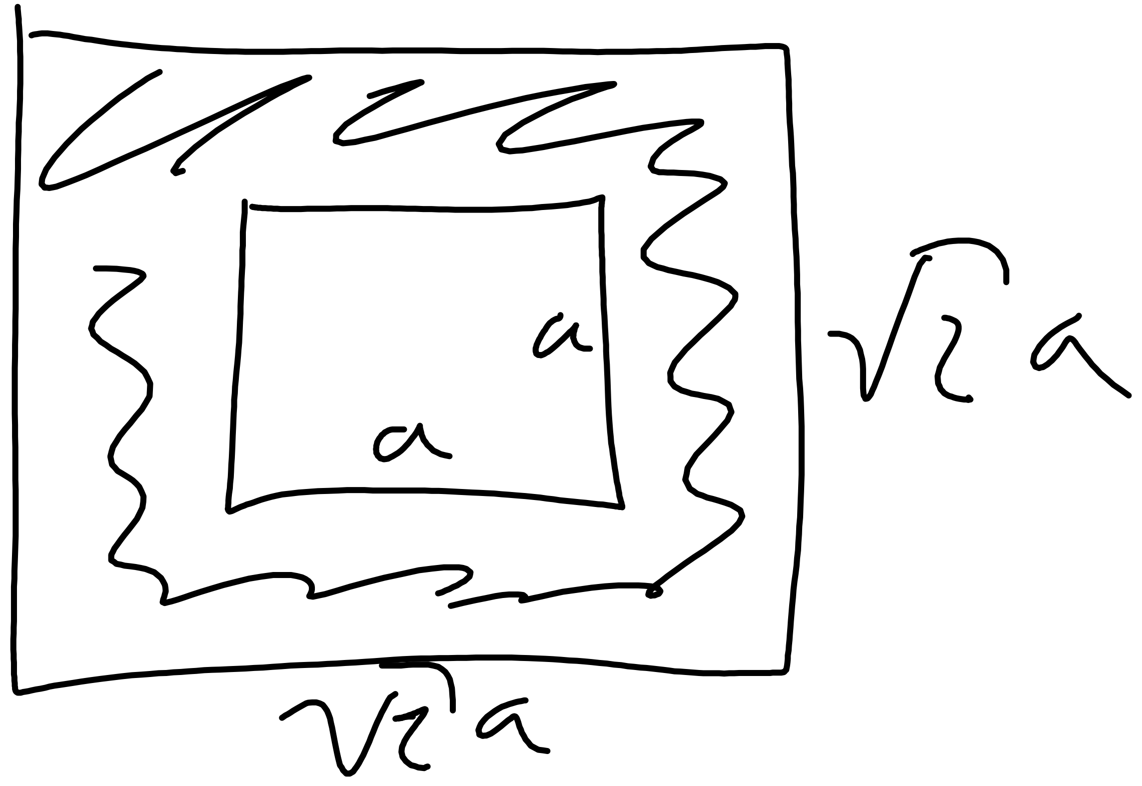
a

a

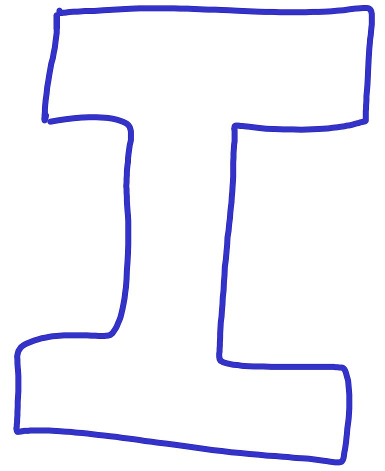
$\frac{\sqrt{16}\,a^4}{12} = 4 \cdot \frac{a^4}{12}$

$\sqrt{2}a$

$\sqrt{2}a$



$3 \cdot \frac{a^4}{12}$



$= \Big|$  $\begin{array}{l} \rho \in [0,\infty) \\ \varphi \in [0,\frac{\pi}{2}] \end{array} \Big| = \int_0^{\frac{\pi}{2}} \left(\int_0^{\infty} e^{-\rho^2} \cdot \rho \, d\rho \right) d\varphi =$

$$\left(-(x^2+y^2) = -(\rho^2 \cdot \cos^2\varphi + \rho^2 \cdot \sin^2\varphi) = -\rho^2 \right)$$

$$= \frac{1}{2} \cdot \int_0^{\frac{\pi}{2}} 1 - 0 \, d\varphi = \frac{1}{2} \cdot \frac{\pi}{2} = \underline{\underline{\frac{\pi}{4}}}$$

$$\Rightarrow \int_0^{\infty} e^{-x^2} \, dx = \frac{\sqrt{\pi}}{2}$$

1.) VÁLC.:

$\varphi \in [0, 2\pi]$

$\rho \in [0, 2]$

$\sqrt{12}$

$z \in [?, ?]$

$16 = 8z$

$z = 2$ ... do 1. rce

$x^2 + y^2 + 4 = 16$ ... TRANSF.

$\rho^2 + 4 = 16 \Rightarrow \rho^2 = 12 \Rightarrow \rho = \sqrt{12}$

$\rho^2 + z^2 = 8z$

$\rho^2 + (z-4)^2 = 16$

$z - 4 = -\sqrt{16-\rho^2}$

$z = 4 - \sqrt{16-\rho^2}$

$$\underbrace{x^2+y^2}+z^2=16$$

$$\rho^2+z^2=16$$

$$z^2=16-\rho^2$$

$$z=\pm\sqrt{16-\rho^2}$$

$$\Rightarrow \quad z \in \left[4-\sqrt{16-\rho^2},\ \sqrt{16-\rho^2}\right]$$

$$\Rightarrow V_1 = \int_0^{2\pi} \int_0^{\frac{\pi}{3}} \int_0^4 1 \cdot \rho^2 \cdot \sin\vartheta \, d\rho \, d\vartheta \, d\varphi = \ldots$$

$$\ldots = \underline{\underline{\frac{64}{3}\pi}}$$

$$V_2 = \int_0^{2\pi} \int_{\frac{\pi}{3}}^{\frac{\pi}{2}} \int_0^{8\cdot\cos\vartheta} 1 \cdot r^2 \cdot \sin\vartheta \; d\rho \, d\vartheta \, d\varphi =$$

$$= \left| \begin{array}{l} t = \cos\vartheta \\ (\cos^2 \cdot \sin) \end{array} \right| = \ldots = \frac{16}{3}\pi$$

$$\boxed{V = V_1 + V_2 = \frac{80}{3}\pi}$$

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