

DIR. ICR.

$$\exists h: \left| \int_a^b f(x) dx \right| \leq h \in \mathbb{R} \quad (\forall b > a)$$

$$\& g \Rightarrow 0$$

(no LOT)

$$\Rightarrow \int_a^{\infty} f \cdot g dx$$

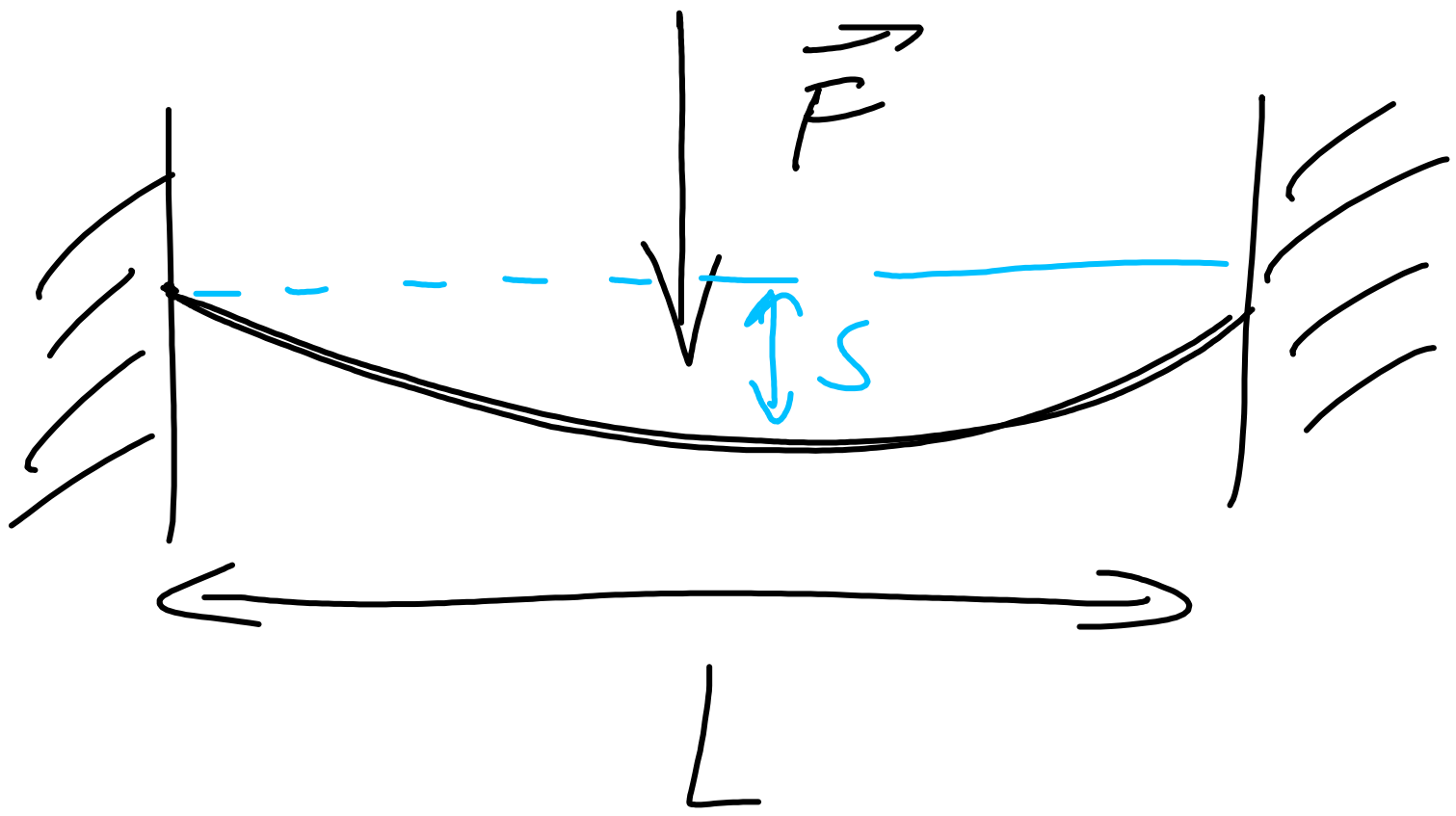
KONV.

$$\int_1^{\infty} \left| \frac{\sin x}{x} \right| dx = \int_1^{\infty} \frac{|\sin x|}{x} dx = \left| 0 \leq \sin^2 x \leq |\sin x| \right|$$

$$\int_1^{\infty} \frac{\sin^2 x}{x} dx = \int_1^{\infty} \frac{1 - \cos 2x}{2x} dx$$

$$\int_0^{\sqrt{\frac{\pi}{2}}} \left(\int_0^{\sqrt{\frac{\pi}{2}}} y^2 \sin x^2 dx \right) dy = \int_0^{\sqrt{\frac{\pi}{2}}} \int_0^x y^2 \sin x^2 dy dx$$

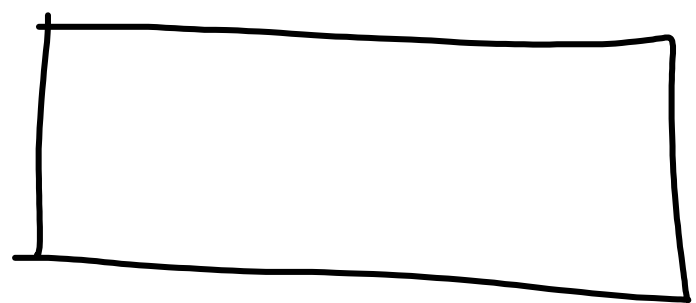
$= \int_0^{\sqrt{\frac{\pi}{2}}} \sin x^2 \cdot \left[\frac{y^3}{3} \right]_0^x dx = \frac{1}{3} \int_0^{\sqrt{\frac{\pi}{2}}} x^3 \sin x^2 dx =$



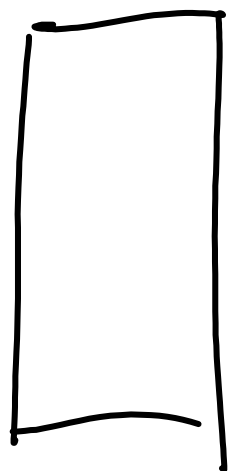
$$s = \frac{F \cdot L^3}{48 \cdot E \cdot I}$$

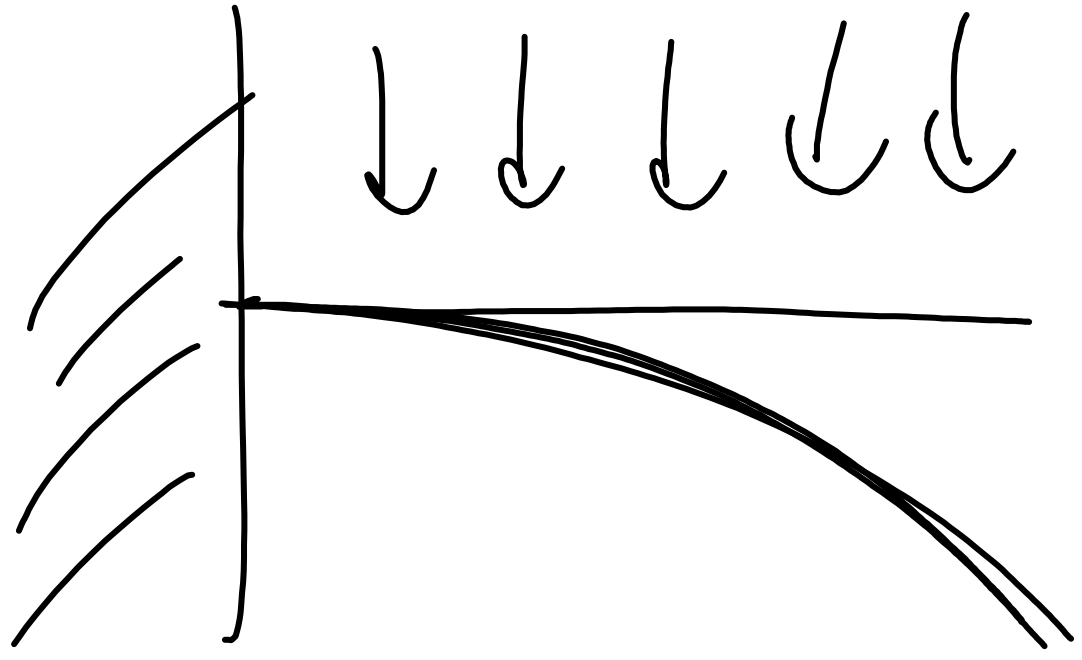
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MAT. KONST.

a) $a=2, b=1 \Rightarrow I = \frac{1}{6}$

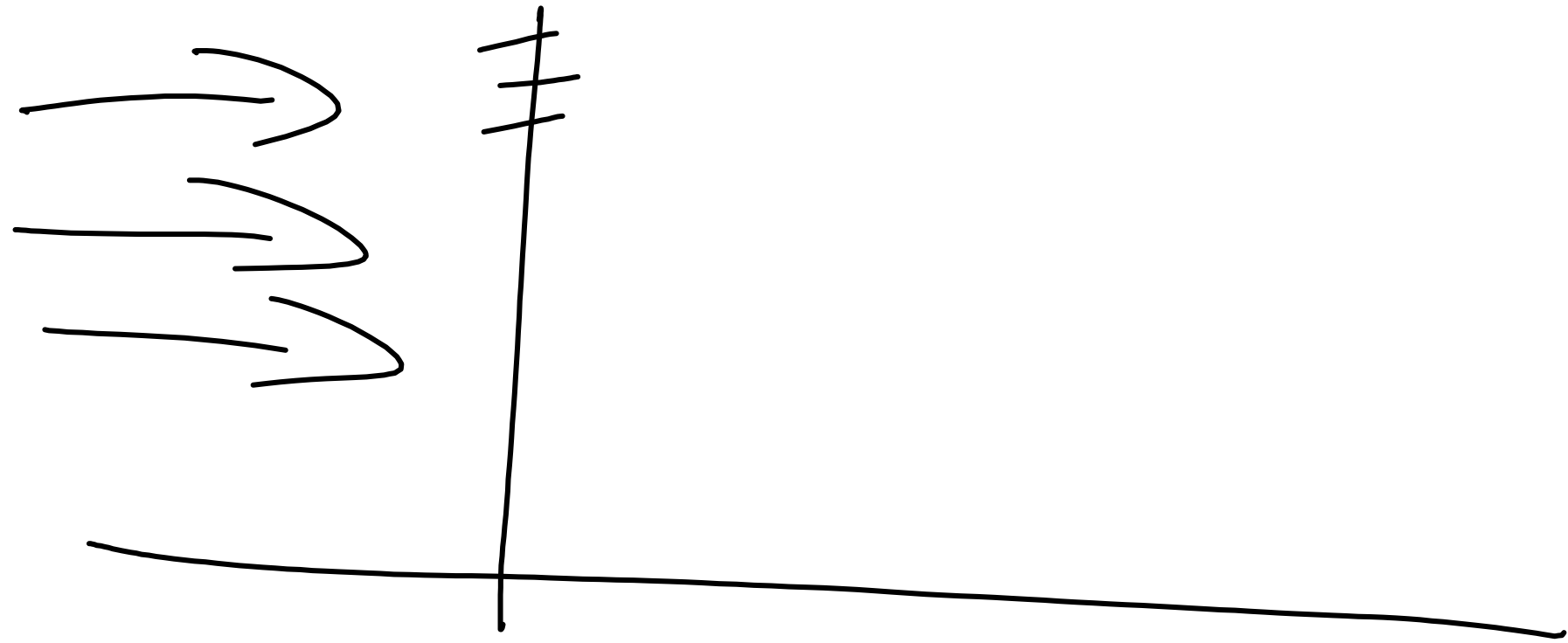


b) $a=1, b=2 \Rightarrow I = \frac{4}{6}$





$$\delta = \frac{q \cdot L^4}{8 \cdot E \cdot I}$$



$$\int_0^{\infty} e^{-x^2} dx$$

$$\cdot \int_0^{\infty} e^{-y^2} dy =$$

$$= \int_0^{\infty} \left(\int_0^{\infty} e^{-x^2} dx \right) e^{-y^2} dy$$

$$= \int_0^{\infty} \int_0^{\infty} e^{-x^2 - y^2} dx dy =$$

$$= \left| \begin{array}{l} t = -g^2 \\ 1 dt = -2g dg \\ g dg = -\frac{1}{2} dt \end{array} \right| \begin{array}{l} S = \infty \Rightarrow t = -\infty \\ S = 0 \Rightarrow t = 0 \end{array} \Bigg| = \int_0^{\frac{\pi}{2}} \int_0^{-\infty} e^t \cdot \left(-\frac{1}{2}\right) dt d\varphi =$$

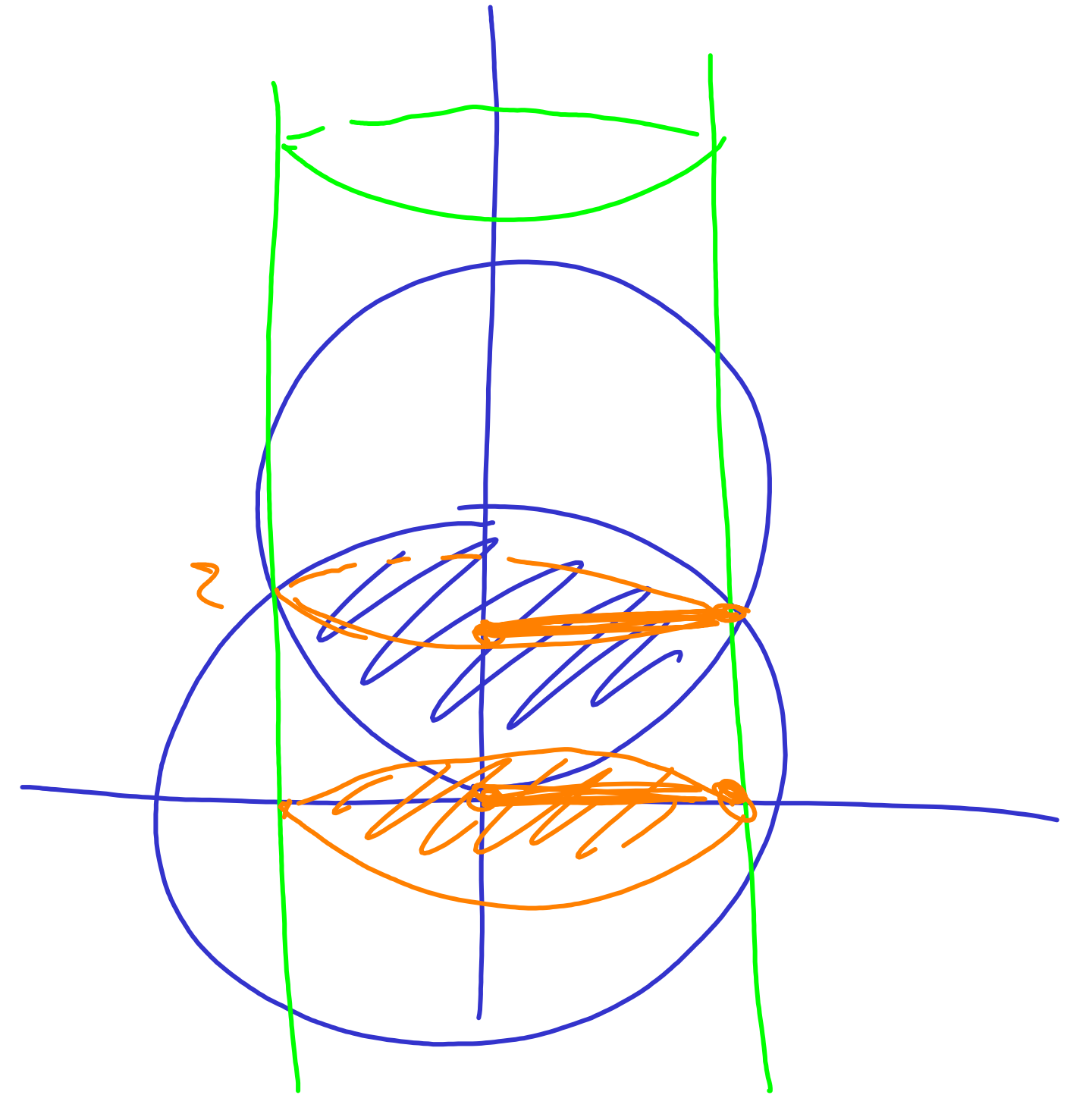
$$= + \frac{1}{2} \cdot \int_0^{\frac{\pi}{2}} \int_{-\infty}^0 e^t dt d\varphi = \frac{1}{2} \cdot \int_0^{\frac{\pi}{2}} \left[e^t \right]_{-\infty}^0 d\varphi =$$

Pr: $V = ?$, $x^2 + y^2 + z^2 = 16$, $x^2 + y^2 + z^2 = 8z$

$$x^2 + y^2 + z^2 - 8z = 0$$

$$x^2 + y^2 + (z-4)^2 - 16 = 0$$

$$x^2 + y^2 + (z-4)^2 = 16$$

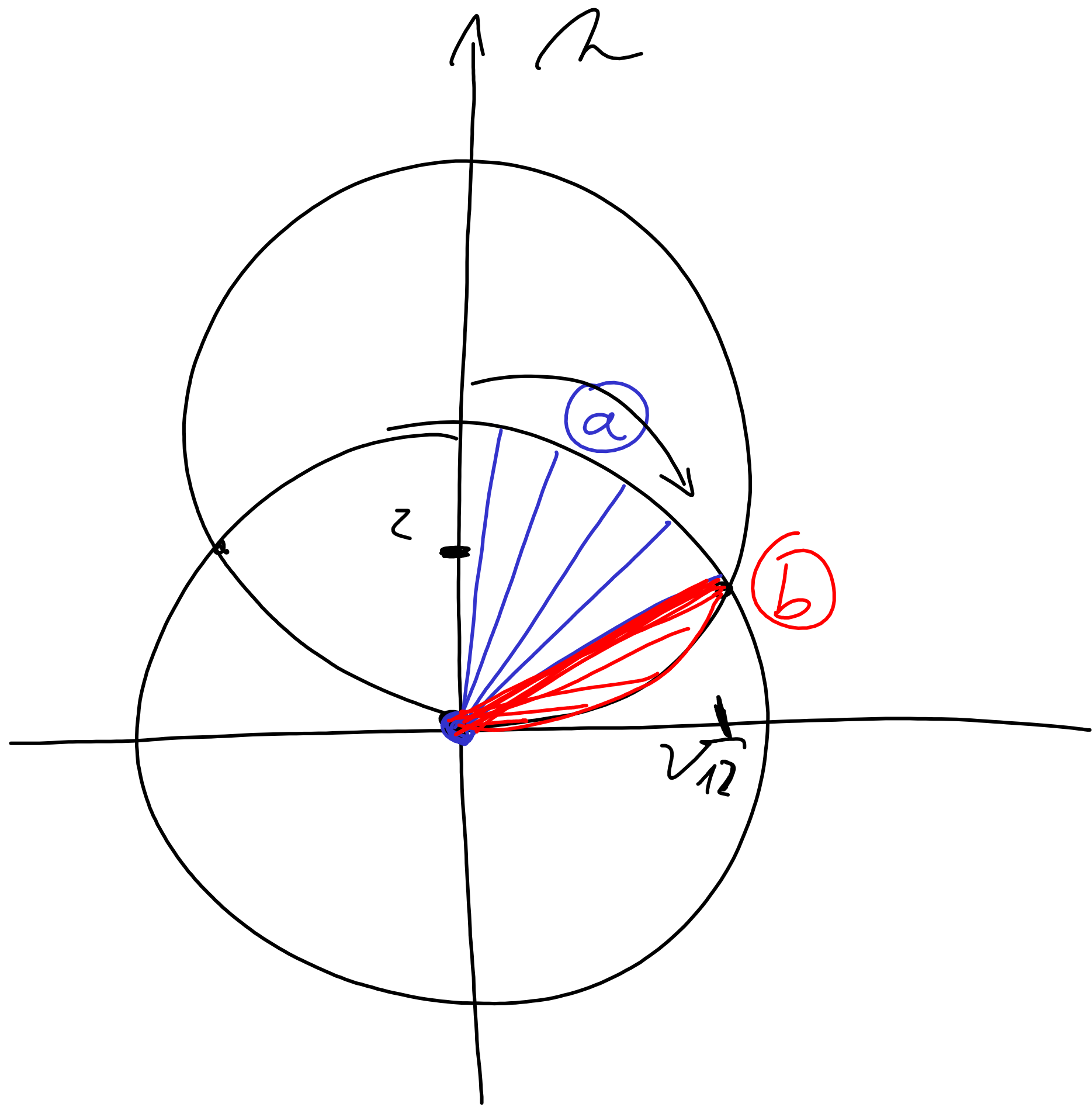


$$\begin{aligned}
 V &= \iiint_H 1 \, dx \, dy \, dz = \int_0^{\sqrt{12}} \int_0^{2\pi} \int_{4-\sqrt{16-\rho^2}}^{\sqrt{16-\rho^2}} 1 \cdot \rho \, dz \, d\phi \, d\rho \\
 &= \dots = \underline{\underline{\frac{80}{3}\pi}}
 \end{aligned}$$

The diagram shows the volume element $1 \cdot \rho \, dz \, d\phi \, d\rho$ with colored brackets indicating the integration limits for each variable:

- Orange bracket for dz from $4 - \sqrt{16 - \rho^2}$ to $\sqrt{16 - \rho^2}$.
- Purple bracket for $d\phi$ from 0 to 2π .
- Orange bracket for $d\rho$ from 0 to $\sqrt{12}$.

The final result is $\frac{80}{3}\pi$, which is underlined twice in orange.



a) $\varphi \in [0, 2\pi]$, $\rho \in [0, 4]$

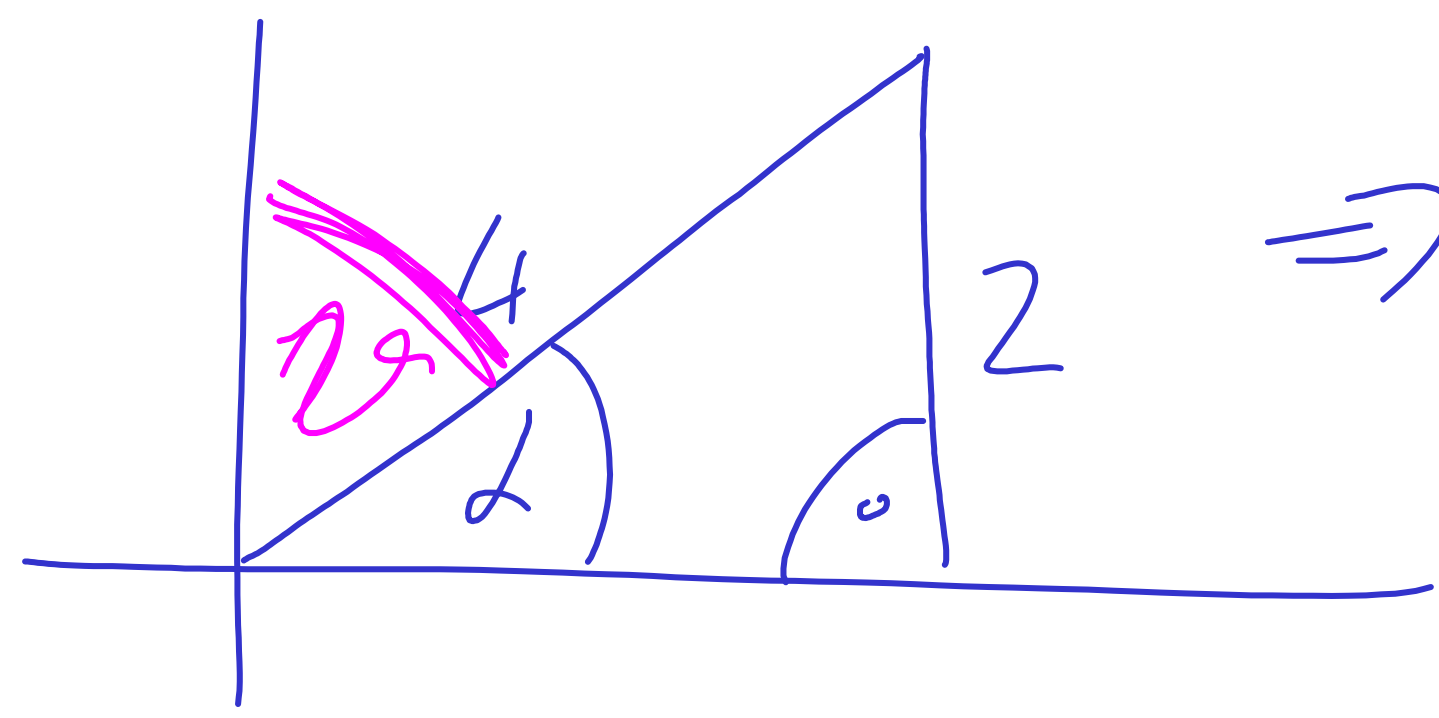
$r \in [0, 2]$

$\frac{\pi}{3}$

$\sin \alpha = \frac{2}{4} = \frac{1}{2}$

$\Rightarrow \alpha = \frac{\pi}{6}$

$r = \frac{\pi}{2} - \frac{\pi}{6} = \frac{\pi}{3}$



(b) $\varphi \in [0, 2\pi]$, $\psi \in \left[\frac{\pi}{3}, \frac{\pi}{2}\right]$

$\rho \in [0, ?]$

$x^2 + y^2 + z^2 = 8R$

$\rho^2 = 8 \cdot \rho \cdot \cos \psi$

$\rho = 8 \cdot \cos \psi$