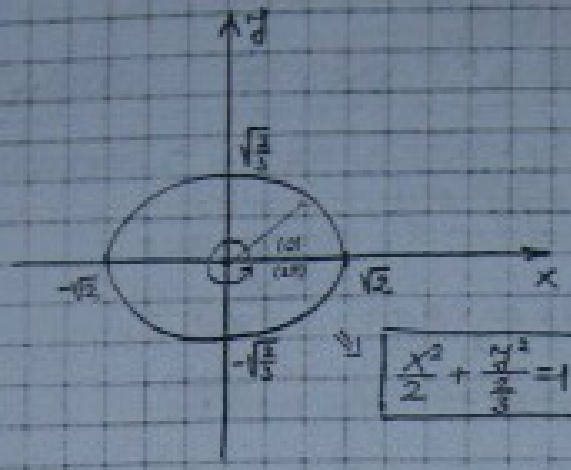

$$\boxed{\frac{x^2}{2}+\frac{y^2}{\frac{2}{3}}=1} \Rightarrow$$

$0 \le \varphi \le 2\pi$

$0 \le \rho \le 1$

$$\left.\begin{aligned} x &= \sqrt{2}\cdot\rho\cos\varphi \\ y &= \sqrt{\tfrac{2}{3}}\,\rho\sin\varphi \end{aligned}\right\} J=\frac{2}{\sqrt{3}}\rho$$

$$V=\iint_D (z_2-z_1)\,dx\,dy=\iint\left(\frac{1}{2}x^2-\frac{1}{2}y^2-x^2-y^2+1\right)dx\,dy=$$

$$=\iint_D\left(-\frac{1}{2}x^2-\frac{3}{2}y^2+1\right)dx\,dy=\iint_D\left(-\frac{1}{2}\cdot 2\rho^2\cos^2\varphi-\frac{3}{2}\cdot\frac{2}{3}\rho^2\sin^2\varphi+1\right)\frac{2}{\sqrt{3}}\rho\,d\rho\,d\varphi=$$

$$=\int_0^{2\pi}d\varphi\cdot\int_0^1(1-\rho^2)\cdot\frac{2}{\sqrt{3}}\rho\,d\rho=\frac{2}{\sqrt{3}}\int_0^{2\pi}d\varphi\cdot I_1$$

$$I_1=\int_0^1(1-\rho^2)\cdot\rho\,d\rho=\int_0^1\rho\,d\rho-\int_0^1\rho^3\,d\rho=\left(\frac{\rho^2}{2}-\frac{\rho^4}{4}\right)\Big|_0^1=\frac{1}{2}-\frac{1}{4}=\frac{1}{4}$$

$$=\frac{2}{\sqrt{3}}\cdot\frac{1}{4}\int_0^{2\pi}d\varphi=\frac{1}{2\sqrt{3}}\cdot 2\pi=\frac{\pi}{\sqrt{3}}\Rightarrow$$

$$\Rightarrow \boxed{V=\frac{\pi}{\sqrt{3}}}$$

$$\boxed{\begin{aligned} &\left(\frac{x}{a}\right)^2+\left(\frac{y}{b}\right)^2=\rho^2 \\ &x=a\rho\cos\varphi \\ &y=b\rho\sin\varphi \\ &dx\,dy=ab\,\rho\,d\rho\,d\varphi \end{aligned}}$$

- КРАЈ - >> 14.06.2003.

Е. Иванов