9 Дадено е тяло $T_1: x^2+y^2=2\sqrt{3}y$, $T_2: x^2+y^2=2x$, $T_3: 4-z=x^2+y^2$

Да се намери V тяло ограничено от тези тела

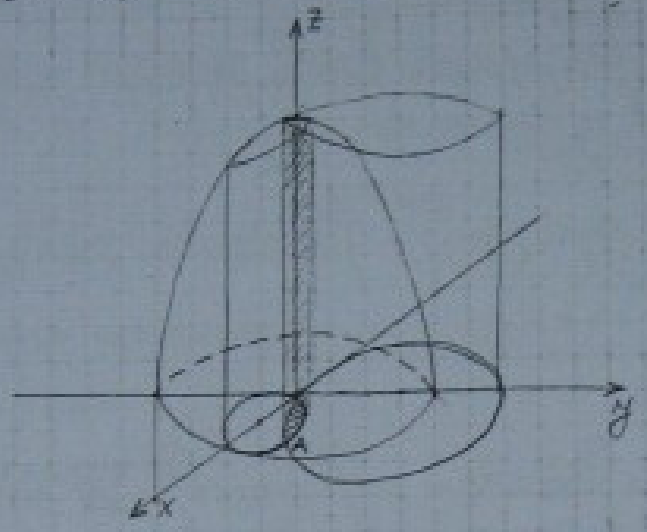
$T_1: x^2+y^2=2\sqrt{3}y$

$x^2+(y-\sqrt{3})^2=3$

$\frac{x^2}{3}+\frac{(y-\sqrt{3})^2}{3}=1$ - Валяк

$T_2: (x-1)^2+y^2=1$ - Валяк

$T_3: 4-z=x^2+y^2$ - парал.



Пресечна точка T_1 и T_2:

$T_3: y=\sqrt{1-(x-1)^2}$

$x^2+(\sqrt{1-(x-1)^2}-\sqrt{3})^2=3$

$x^2+1-(x-1)^2-2\sqrt{3}\cdot\sqrt{1-(x-1)^2}+3=3$

$\cancel{x^2}+\cancel{1}-\cancel{x^2}+2x-\cancel{1}-2\sqrt{3}\cdot\sqrt{1-1^2+2x-x^2}=0$

$2x-2\sqrt{3}\cdot\sqrt{2x-x^2}=0$

$2x=2\sqrt{3}\sqrt{2x-x^2}\ /^2$

$4x^2=4\cdot 3\cdot(2x-x^2)$

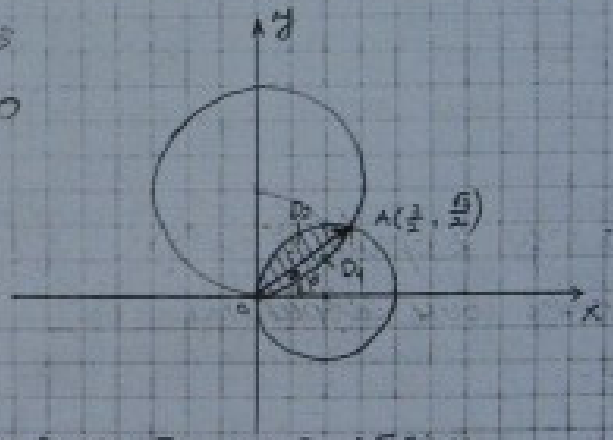
$x^2+3x^2-6x=0$

$4x^2-6x=0$

$2x\cdot(2x-3)=0$

$\Rightarrow x_1=0 \Rightarrow y_1=0$

$A=x_2=\frac{3}{2} \Rightarrow y_2=\frac{\sqrt{3}}{2}$



$T_1: x^2+y^2=2\sqrt{3}y \Rightarrow \rho=2\sqrt{3}\sin\varphi$

$T_2: x^2+y^2=2x \Rightarrow \rho=2\cos\varphi$

$\frac{y}{x}=tg\varphi=\frac{\frac{\sqrt{3}}{2}}{\frac{3}{2}}=\frac{1}{\sqrt{3}} \Rightarrow \boxed{\varphi=\frac{\pi}{6}}$

$D_1: 0\le\varphi\le\frac{\pi}{6}$; $0\le\rho\le 2\sqrt{3}\sin\varphi$

$D_2: \frac{\pi}{6}\le\varphi\le\frac{\pi}{2}$; $0\le\rho\le 2\cos\varphi$

$\left.\begin{array}{l} x^2+y^2=2\sqrt{3}y \\ x^2+y^2=2x \end{array}\right\}$ $2x=2\sqrt{3}y$, $x=\sqrt{3}y$ $\Rightarrow$ $\rho\cos\varphi=\sqrt{3}\rho\sin\varphi \Rightarrow tg\varphi=\frac{1}{\sqrt{3}} \Rightarrow \boxed{\varphi=\frac{\pi}{6}}$