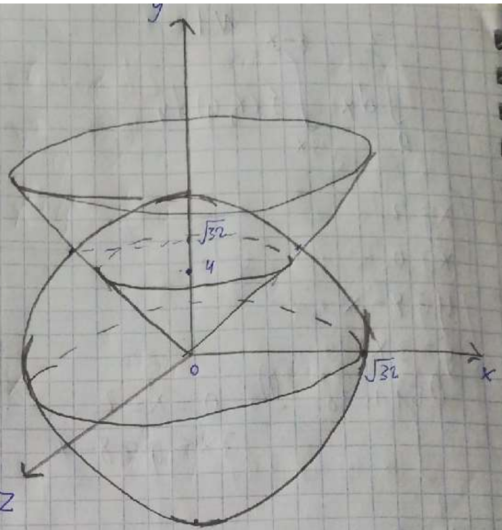
№ 2

Сфера $x^2+y^2+z^2=32$

Конус $y^2=x^2+z^2$ $(y\geq 0)$

$V-?$



$$\begin{cases} x=r\cdot\cos\varphi \\ z=r\cdot\sin\varphi \\ y=y \end{cases}$$

$y^2=r_x^2=32-r^2$

$y=4$

$dx=-r\cdot\sin\varphi\, d\varphi$

$dz=-r\cdot\cos\varphi\, d\varphi$

$dy=dr$

$$V=\iiint\limits_V y\,dx\,dy\,dz=\iiint\limits_V y\cdot r\,dr\cdot dy\cdot d\varphi=$$

$$=\int_0^{\frac{\pi}{2}}d\varphi\int_0^R r\,dr\int_0^{\sqrt{32-r^2}}y\,dy=\int_0^{\frac{\pi}{2}}d\varphi\int_0^R\frac{32-r^2}{2}\cdot r\,dr=$$

$$V=\iiint\limits_V y\,dx\,dy\,dz=\iiint\limits_V y\cdot r\,dr\,dy\,d\varphi=\int_0^{\frac{\pi}{2}}d\varphi\int_0^R r\,dr\int_0^{\sqrt{32-r^2}}y\,dy=$$

$$=\int_0^{\frac{\pi}{2}}d\varphi\int_0^R\frac{y^2}{2}\Big|_0^{\sqrt{32-r^2}}r\,dr=\int_0^{\frac{\pi}{2}}d\varphi\int_0^R\frac{32-r^2}{2}\cdot r\,dr=$$

$$=\frac{\pi}{4}\int_0^R(32r-r^3)dr=\frac{\pi}{4}\left(16R^2-\frac{R^4}{4}\right)=\frac{\pi}{4}\left(16\cdot 32-\frac{1024}{4}\right)=$$

$$=64\pi$$