$$V=\int_0^{2\pi}\int_0^{2}\int_{-\sqrt{9-R^2}}^{\sqrt{9-R^2}} 1\cdot R\,dz\,dR\,d\theta=\int_0^{2\pi}\int_0^{2} R\left[2\sqrt{9-R^2}\right]dR\,d\theta=$$

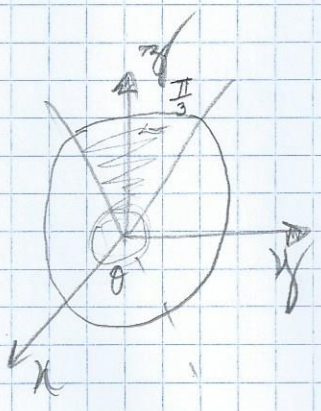
$$=\int_0^{2\pi}\left[\frac{-(9-R^2)^{3/2}}{3/2}\right]_0^{2}d\theta=\left[-\frac{2}{3}(9-4)^{3/2}+\frac{2}{3}(9-0)^{3/2}\right]2\pi=$$

$$=\left[-\frac{2}{5}5\sqrt{5}+\frac{2}{3}3^3\right]2\pi$$

pag. 459 - 1005 c/ esféricas

9) Volume ? (com esféricas) do sólido limitado sup. $\rho=4$ e inf. por $\varphi=\frac{\pi}{3}$

$\rho=4 \quad \rho^2=16 \quad x^2+y^2+z^2=16$



$$\begin{cases} x=\rho\operatorname{sen}\varphi\cos\theta & 0\le\theta\le 2\pi \\ y=\rho\operatorname{sen}\varphi\operatorname{sen}\theta & 0\le\varphi\le \pi/3 \\ z=\rho\cos\varphi & 0\le\rho\le 4 \Rightarrow \text{raio} \end{cases}$$

$$|J|=\rho^2\operatorname{sen}\varphi$$

$$V=\int_0^{2\pi}\int_0^{\pi/3}\int_0^{4} 1\cdot\rho^2\operatorname{sen}\varphi\,d\rho\,d\varphi\,d\theta=$$

$$=\int_0^{2\pi}\int_0^{\pi/3}\left[\frac{\rho^3}{3}\right]_0^{4}\operatorname{sen}\varphi\,d\varphi\,d\theta=\int_0^{2\pi}\int_0^{\pi/3}\frac{4^3}{3}\operatorname{sen}\varphi\,d\varphi\,d\theta=$$

$$=\frac{4^3}{3}\int_0^{2\pi}\left[-\cos\varphi\right]_0^{\pi/3}d\theta=\frac{4^3}{3}\left(-\frac{1}{2}+1\right)2\pi=\frac{4^3}{3}\frac{1}{2}2\pi=\frac{64}{3}\pi$$