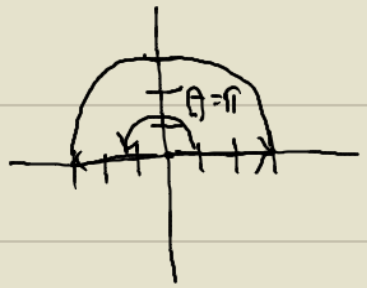
4. $\int_{x=-3}^{x=3} \int_{y=0}^{y=\sqrt{9-x^2}} (x^2+y^2)\, dy\, dx$



$y=0$

$r\sin\theta = 0$

$r=0$

$y=\sqrt{9-x^2}$

$y^2 = 9-x^2$

$x^2+y^2=9$

$r^2=9$

$r=\pm\sqrt{9}$

$r=3$

$r^2 = x^2+y^2$

$= \int_{\theta=0}^{\theta=\pi} \int_{r=0}^{r=3} (r^2)\, r\, dr\, d\theta$

$= \int_{\theta=0}^{\theta=\pi} \int_{r=0}^{r=3} r^3\, dr\, d\theta$

$= \int_{\theta=0}^{\theta=\pi} \left[\frac{1}{4}r^4\right]_{r=0}^{r=3} d\theta$

$= \frac{1}{4}\int_{\theta=0}^{\theta=\pi} \left[3^4 - 0^4\right] d\theta$

$= \frac{1}{4}\cdot 81 \int_{\theta=0}^{\theta=\pi} d\theta$

$= \frac{81}{4}\left[\theta\right]_{\theta=0}^{\theta=\pi}$

$= \frac{81}{4}\left[\pi - 0\right]$

$= \frac{81\pi}{4}$