

4.  $0 \leq z \leq 5-x-3y$   $x^2 + y^2 \leq 9$   $\rho(x,y,z) = K\sqrt{x^2+y^2}$

$$m = \int_{x=-3}^{x=3} \int_{y=-\sqrt{9-x^2}}^{y=\sqrt{9-x^2}} \int_{z=0}^{z=5-x-3y} K\sqrt{x^2+y^2} dz dy dx$$

y's  
 $x^2 + y^2 \leq 9$   
 $x^2 + y^2 = 9$   
 $y^2 = 9 - x^2$   
 $y = \pm\sqrt{9-x^2}$

$$m = \int_{\theta=0}^{\theta=2\pi} \int_{r=0}^{r=3} \int_{z=0}^{z=5-r\cos\theta-3r\sin\theta} K\sqrt{r^2} r dz dr d\theta$$



x's  
 $x^2 + y^2 = 9$   
 $x^2 + 0 = 9$   
 $x = \pm 3$

$$m = K \int_{\theta=0}^{\theta=2\pi} \int_{r=0}^{r=3} \int_{z=0}^{z=5-r\cos\theta-3r\sin\theta} r^2 dz dr d\theta$$

$$m = K \int_{\theta=0}^{\theta=2\pi} \int_{r=0}^{r=3} [zr^2]_{z=0}^{z=5-r\cos\theta-3r\sin\theta} dr d\theta$$

$$m = K \int_{\theta=0}^{\theta=2\pi} \int_{r=0}^{r=3} r^2 [5-r\cos\theta-3r\sin\theta-0] dr d\theta$$

$$m = K \int_{\theta=0}^{\theta=2\pi} \int_{r=0}^{r=3} (5r^2 - r^3\cos\theta - 3r^3\sin\theta) dr d\theta$$

$$m = K \int_{\theta=0}^{\theta=2\pi} \left[ \frac{5}{3}r^3 - \frac{1}{4}r^4\cos\theta - \frac{3}{4}r^4\sin\theta \right]_{r=0}^{r=3} d\theta$$

$$m = K \int_{\theta=0}^{\theta=2\pi} \left[ \frac{5}{3} \cdot 3^3 - \frac{1}{4} \cdot 3^4 \cos\theta - \frac{3}{4} \cdot 3^4 \sin\theta \right] d\theta$$

$$m = K \int_{\theta=0}^{\theta=2\pi} \left( 45 - \frac{81}{4}\cos\theta - \frac{243}{4}\sin\theta \right) d\theta$$

$$m = K \left[ 45\theta - \frac{81}{4}\sin\theta + \frac{243}{4}\cos\theta \right]_{\theta=0}^{\theta=2\pi}$$