(33) $x^2+y^2=4 \quad x\geq 0 \quad$ density $= k = \rho(x,y)$

$x = 2\cos t \quad y = 2\sin t \quad t \in [-\frac{\pi}{2}, \frac{\pi}{2}]$

$$\bar{x} = \frac{1}{m}\int_C x\,\rho(x,y)\,ds \qquad \bar{y} = \frac{1}{m}\int_C y\,\rho(x,y)\,ds$$

$$m = \int_C \rho(x,y)\,ds = \int_C k\,ds \qquad m = k\int_C ds \rightsquigarrow \frac{2\pi(2)}{(2)} = 2\pi$$

$$m = 2\pi k$$

$$\bar{x} = \frac{k}{m}\int_C x\,ds \qquad ds = \sqrt{4\sin^2 t + 4\cos^2 t}\,dt = 2\,dt$$

$$\bar{x} = \frac{k}{m}\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} 2\cos t\,dt = \frac{4k}{m}\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} \cos t\,dt = \frac{4k}{m}(\sin t)\Big|_{-\frac{\pi}{2}}^{\frac{\pi}{2}} = \frac{8k}{m}$$

$$\frac{8k}{2\pi k} = \frac{4}{\pi}$$

$$\bar{y} = \frac{k}{m}\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} 4\sin t\,dt = \frac{4k}{m}\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} \sin t\,dt = \frac{4k}{m}(-\cos t)\Big|_{-\frac{\pi}{2}}^{\frac{\pi}{2}} = 0$$

mass of wire: $m = 2\pi k$

Center of mass of wire: $(\frac{4}{\pi}, 0)$