So $\bar{y} = \dfrac{\int_0^\pi y \rho \, ds}{\int_0^\pi \rho \, ds}$. Substituting $\pi a \rho$ for $\int_0^\pi \rho \, ds$ and $a d\theta$ for ds gives us

$\bar{y} = \dfrac{\int_0^\pi y \rho a \, d\theta}{\pi a \rho}$, but y is a function of θ. $y = a\sin\theta$ so we can substitute for it.

$$\bar{y} = \frac{\int_0^\pi \rho a \, a\sin\theta \, d\theta}{\pi a \rho} = \frac{\int_0^\pi \rho a^2 \sin\theta \, d\theta}{\pi a \rho}$$

evaluating this, $\bar{y} = \dfrac{\left[\rho a^2(-\cos\theta)\right]_0^\pi}{\pi a \rho} = \dfrac{2\rho a^2}{\pi a \rho} = \dfrac{2a}{\pi}$

So the centre of mass lies at $\left(0, \frac{2a}{\pi}\right)$, in x and y coordinates.