Then we get

$$\mu = -(1/4)(e^{i\phi}-1)^2 = \frac{1}{4} e^{i\phi}[2-2\cos\theta]$$

$$= (1/4)\cos\phi\,[2-2\cos\theta] + \frac{1}{4} i \sin\theta\,[2-2\cos\theta]$$

$$= x + iy$$

with $\boxed{x = \frac{1}{4}\cos\phi\,[2-2\cos\theta],\quad y = \frac{1}{4}\sin\theta\,[2-2\cos\theta].}$

Normally in polar coordinates we have

$x = \rho\cos\phi,\ y = \rho\sin\phi \Rightarrow y/x = \tan\phi$. Here we

have $y/x = \dfrac{\frac{1}{4}\sin\phi\,[2-2\cos\theta]}{1/4\,\cos\phi\,[2-2\cos\theta]} = \tan\phi$! So, ϕ

is a polar angle. Evidently we have

$$\boxed{\rho = |\mu| = \frac{1}{4}\,|2-2\cos\theta| = \frac{1}{2}(1-\cos\theta)}$$

The equation of a cardioid is

$$x^2+y^2+\frac{1}{2}x = \frac{1}{2}\sqrt{x^2+y^2}$$

See the attached page.