

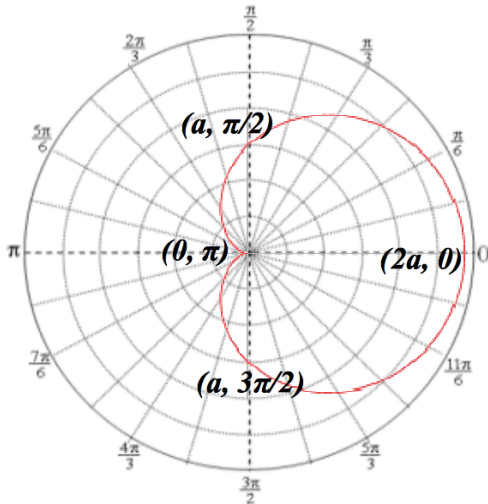
POLAR CIRCLES

Equation	Description
$r = 2a \sin \theta$	Circle; radius a ; center at rectangular coordinate $(0, a)$
$r = -2a \sin \theta$	Circle; radius a ; center at rectangular coordinate $(0, -a)$
$r = 2a \cos \theta$	Circle; radius a ; center at rectangular coordinate $(a, 0)$
$r = -2a \cos \theta$	Circle; radius a ; center at rectangular coordinate $(-a, 0)$

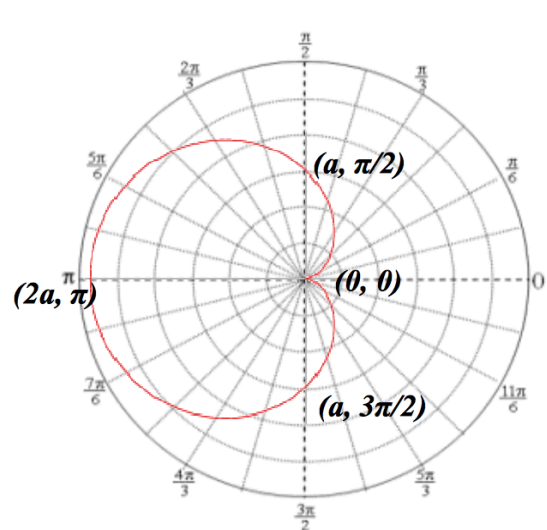


Cardioid

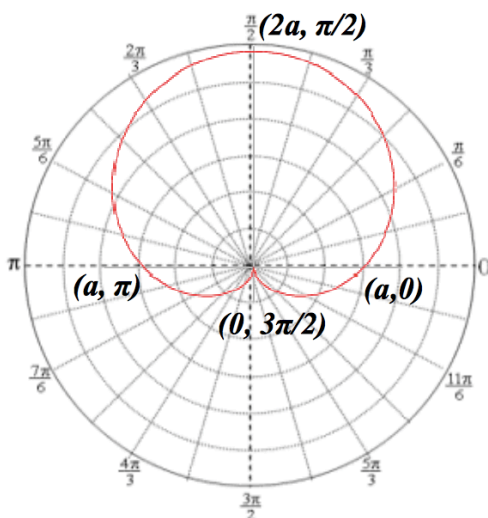
$$r = a(1 + \cos \theta)$$



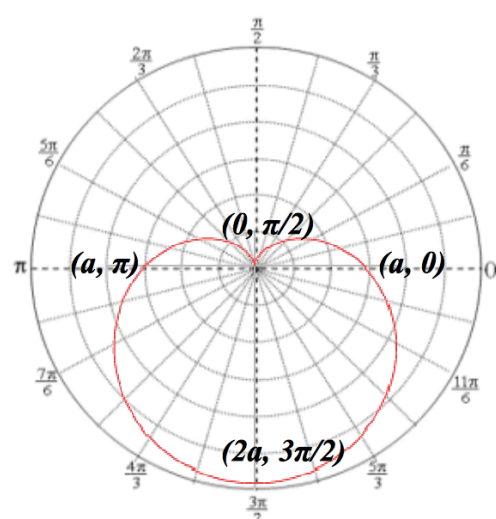
$$r = a(1 - \cos \theta)$$



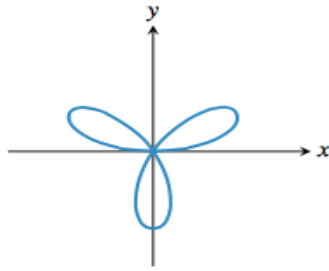
$$r = a(1 + \sin \theta)$$



$$r = a(1 - \sin \theta)$$



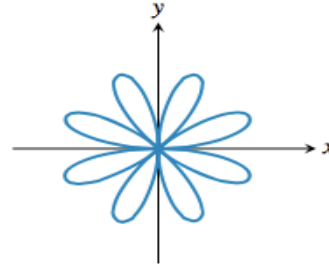
ROSE CURVES



$$r = a \sin n\theta, n \text{ odd}$$

$$0 \leq \theta \leq \pi$$

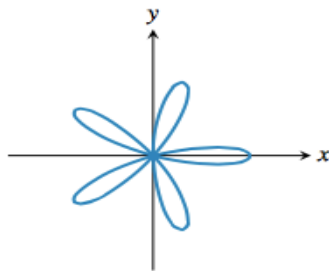
n petals
y-axis symmetry



$$r = a \sin n\theta, n \text{ even}$$

$$0 \leq \theta \leq 2\pi$$

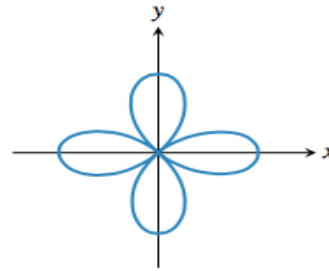
$2n$ petals
y-axis symmetry and
x-axis symmetry



$$r = a \cos n\theta, n \text{ odd}$$

$$0 \leq \theta \leq \pi$$

n petals
x-axis symmetry



$$r = a \cos n\theta, n \text{ even}$$

$$0 \leq \theta \leq 2\pi$$

$2n$ petals
y-axis symmetry and
x-axis symmetry

Dimpled Limacon

$$r = a \mp b \sin \theta, \quad r = a \mp b \cos \theta, \quad a \neq 0, b \neq 0, 1 < \left| \frac{a}{b} \right| < 2$$

