Geometria Analítica

Coordenadas polares

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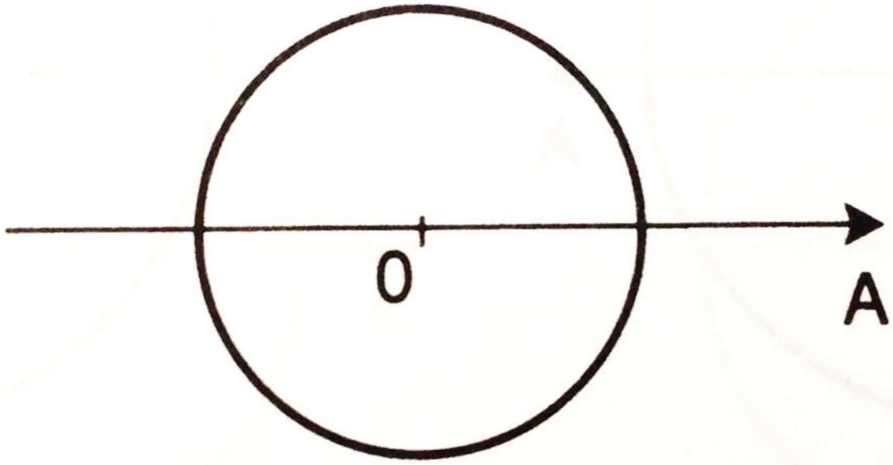
Circunferências

Circunferência centrada no pólo e raio c

$$r = c, \qquad c \in \mathbb{R}$$

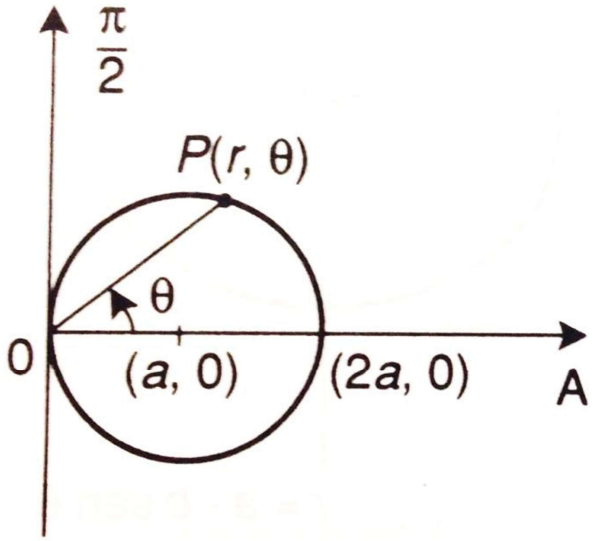


Circunferências

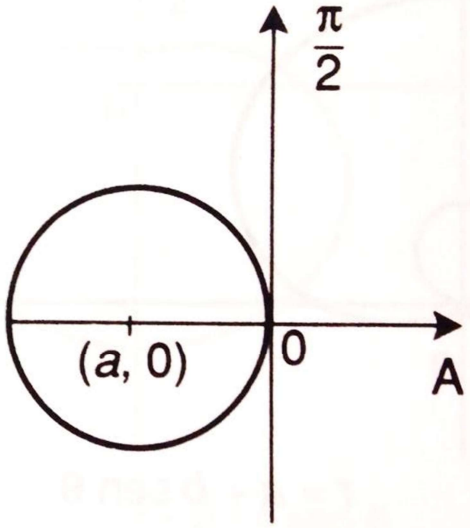
$$r = 2a\cos\theta$$

Circunferência de centro no eixo polar, tangente ao eixo θ = π/2

- Se a > 0, o gráfico está à direita do pólo
- Se a < 0, o gráfico está a esquerda do pólo



[r = 2a cos θ, a>0]



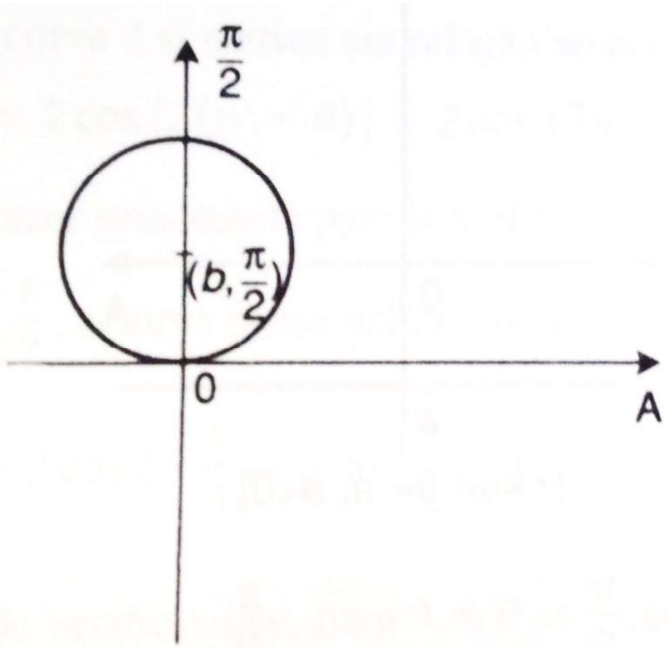
[r = 2a cos θ, a<0]

Circunferências

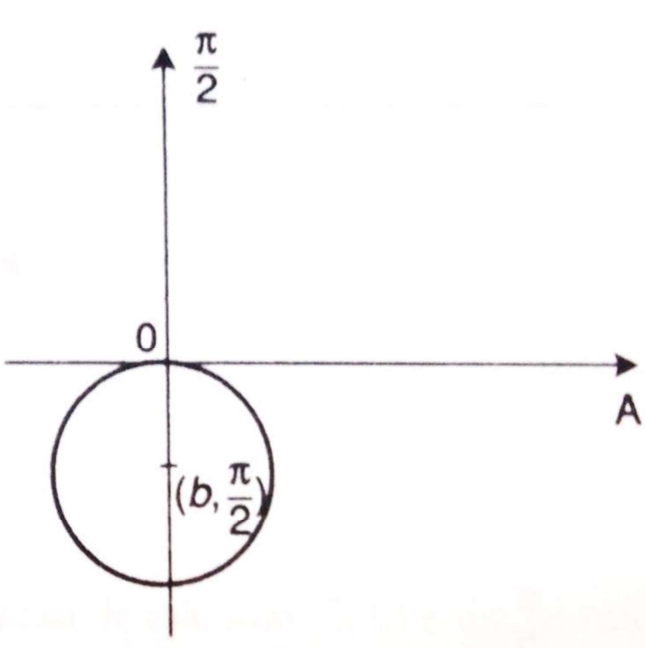
$$r = 2b\,\text{sen}\theta$$

Circunferência de centro no eixo π/2 e tangente ao eixo polar

- Se b > 0, o gráfico está acima do pólo
- Se b < 0, o gráfico está abaixo do pólo



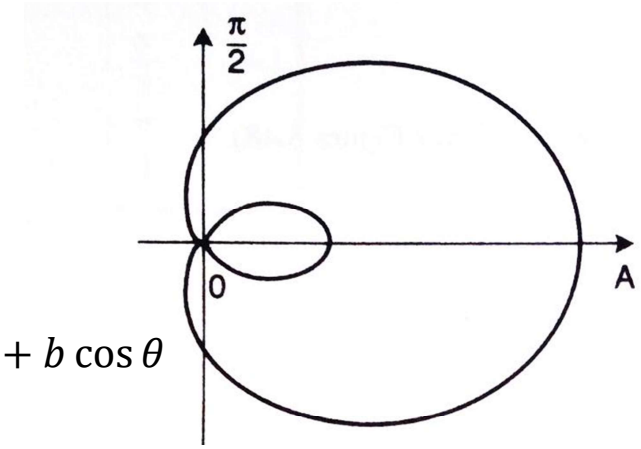
[r = 2b sen θ, b>0]



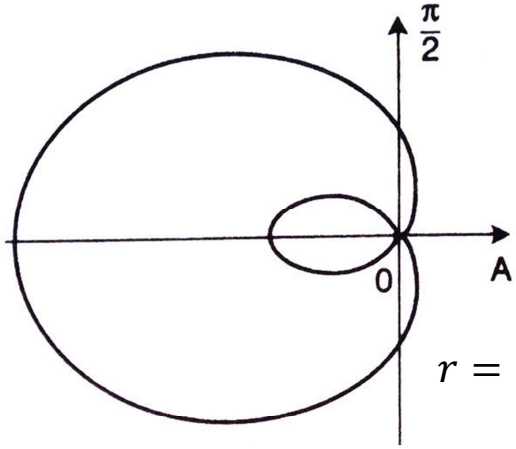
[r = 2b sen θ, b<0]

Limaçons

→ $r = a \pm b\cos\theta \qquad a, b \in \mathbb{R}; \quad b > a$

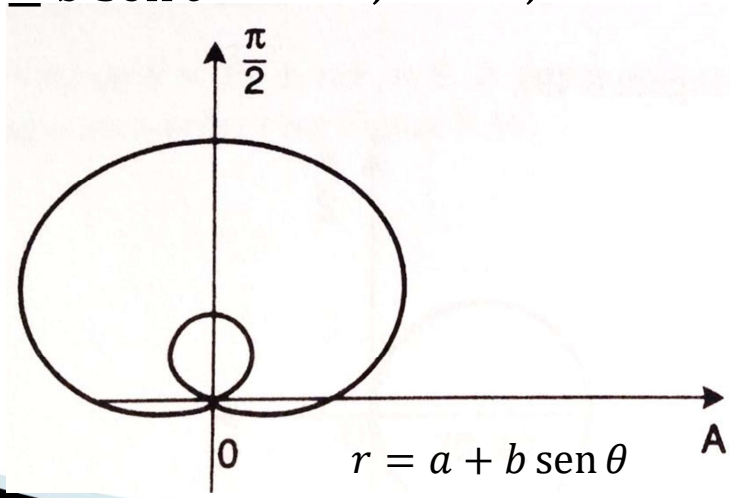


$r = a + b\cos\theta$

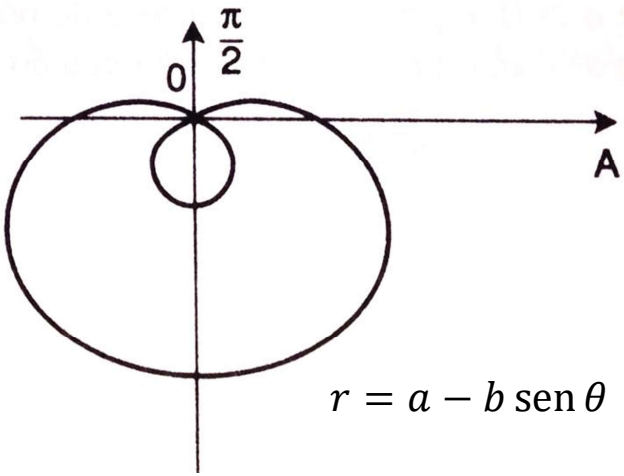


$r = a - b\cos\theta$

→ $r = a \pm b\,\text{sen}\,\theta \qquad a, b \in \mathbb{R}; \quad b > a$



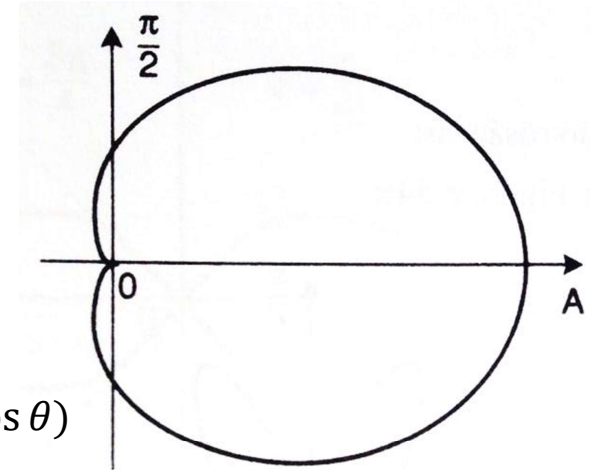
$r = a + b\,\text{sen}\,\theta$



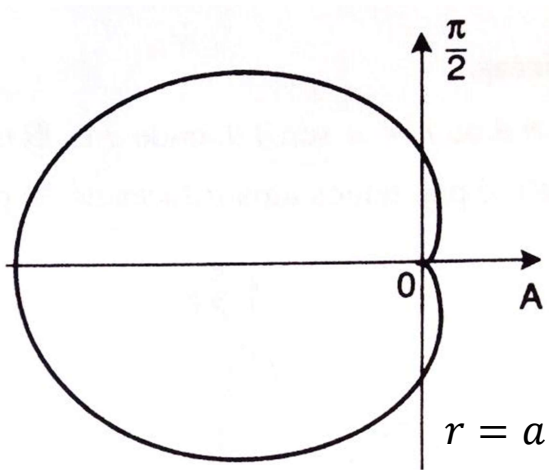
$r = a - b\,\text{sen}\,\theta$

Limaçon (cardióide)

→ $r = a \pm b\cos\theta \qquad a, b \in \mathbb{R}; \quad b = a$

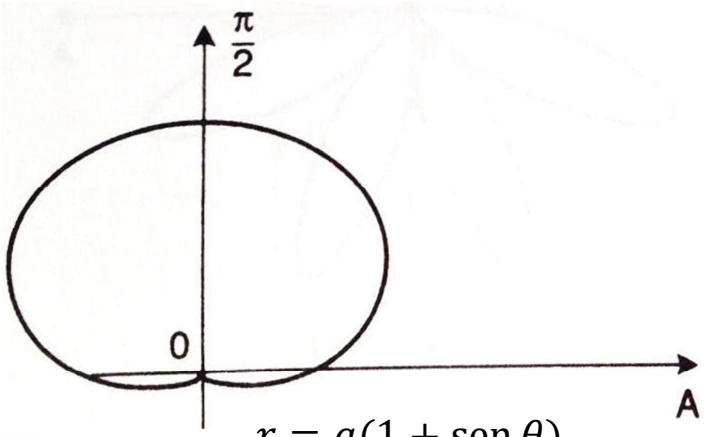


$r = a(1 + \cos\theta)$

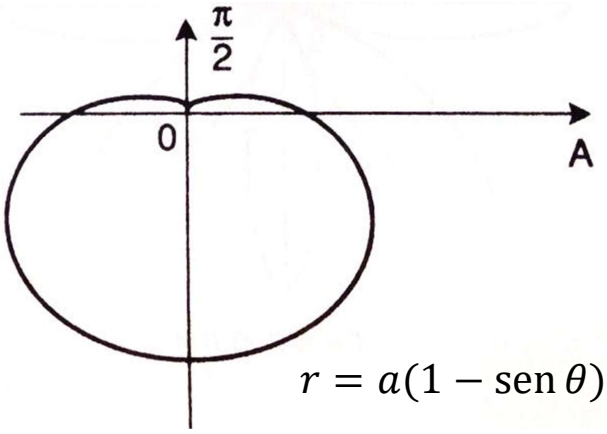


$r = a(1 - \cos\theta)$

→ $r = a \pm b\,\text{sen}\,\theta \qquad a, b \in \mathbb{R}; \quad b = a$



$r = a(1 + \text{sen}\,\theta)$

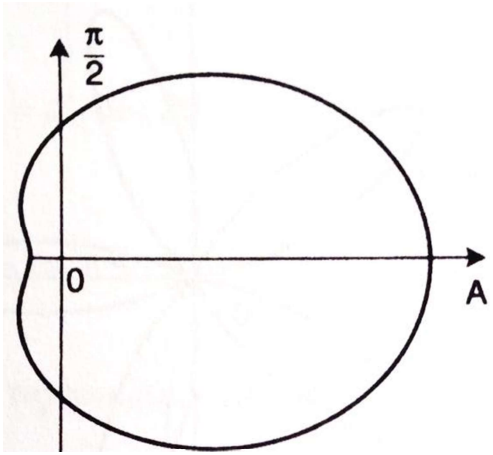


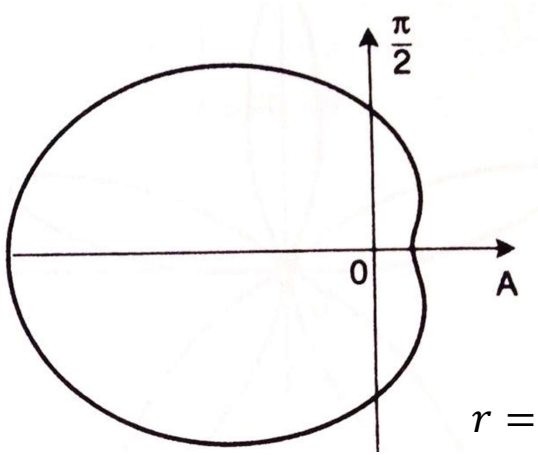
$r = a(1 - \text{sen}\,\theta)$

Limaçons

→ $r = a \pm b\cos\theta \qquad a, b \in \mathbb{R}; \quad b < a$

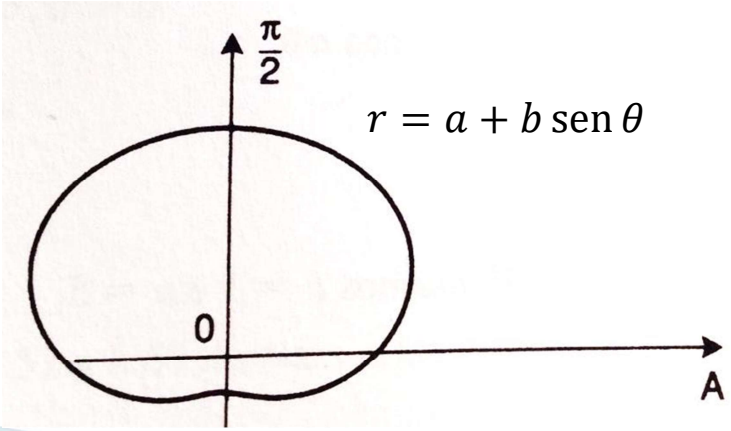
$r = a + b\cos\theta$

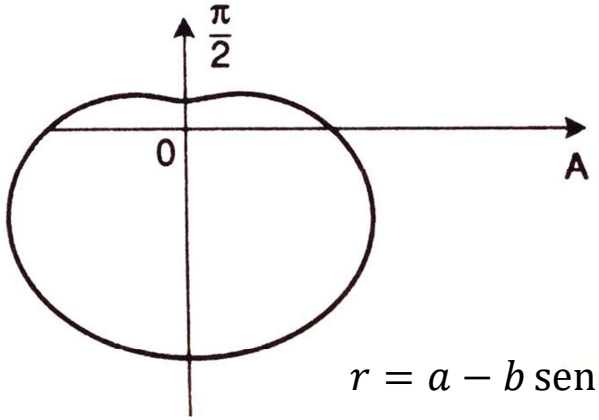




$r = a - b\cos\theta$

→ $r = a \pm b\,\text{sen}\,\theta \qquad a, b \in \mathbb{R}; \quad b < a$



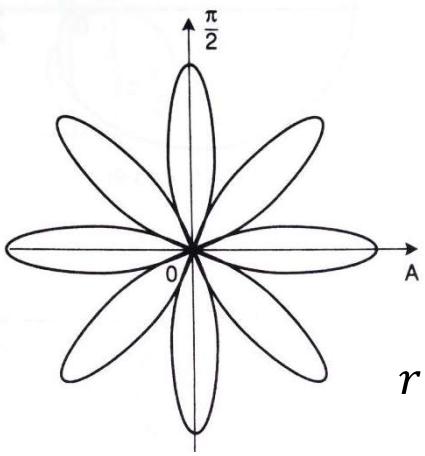


$r = a - b\,\text{sen}\,\theta$

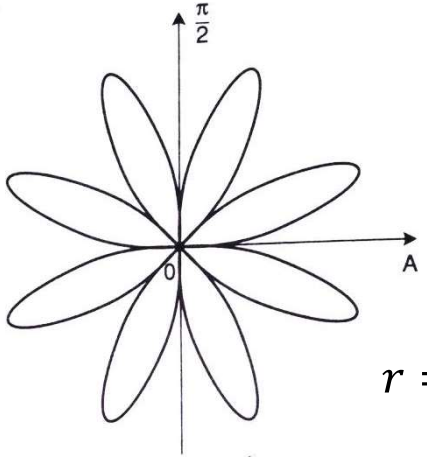
Rosáceas

$r = a\ \cos n\theta$ ou $r = a\ \operatorname{sen} n\theta$ $a \in \mathbb{R};\ n \in \mathbb{N}$

- Se ***n* é par**, temos uma rosácea de $2n$ pétalas

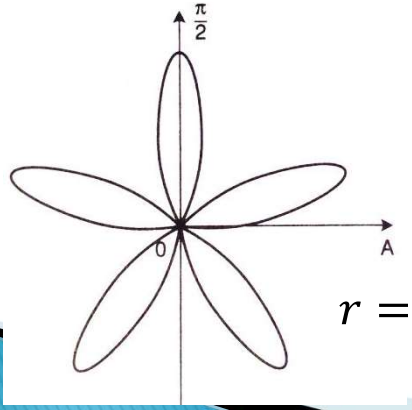


$r = a\ \cos n\theta$

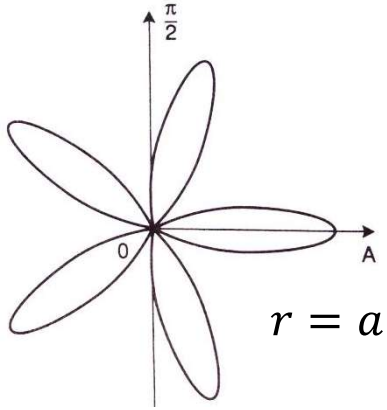


$r = a\ \operatorname{sen} n\theta$

- Se n é impar, temos uma rosácea de n pétalas



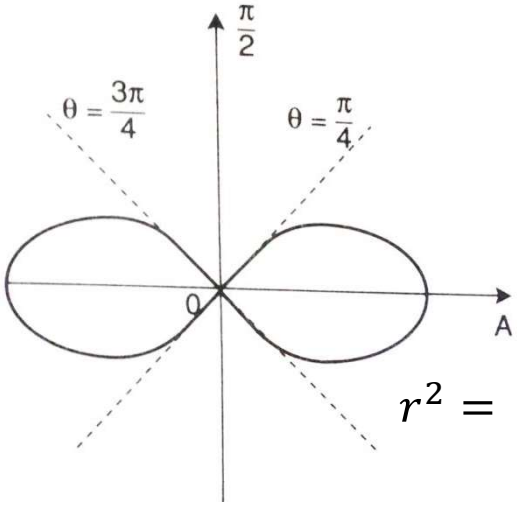
$r = a\ \operatorname{sen} n\theta$



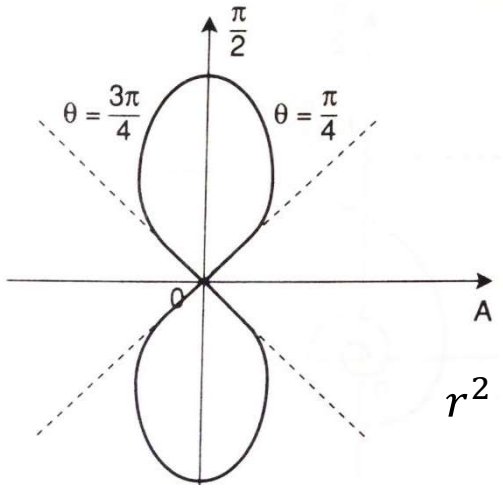
$r = a\ \cos n\theta$

Lemniscatas

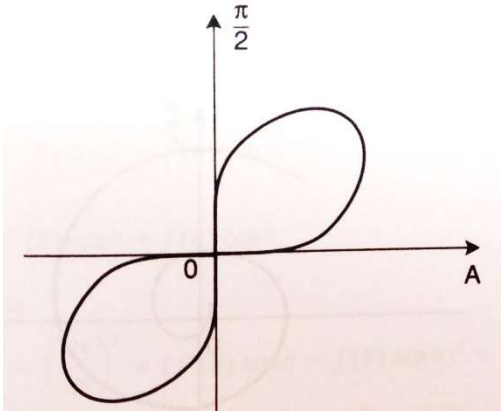
$r^2 = \pm a^2 \cos 2\theta$ ou $r^2 = \pm a^2 \operatorname{sen} 2\theta$ $a \in \mathbb{R}$



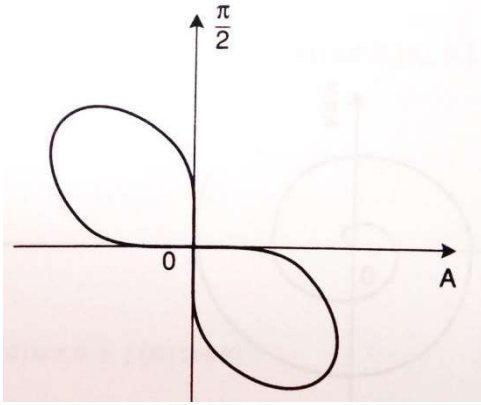
$r^2 = a^2 \cos 2\theta$



$r^2 = -a^2 \cos 2\theta$



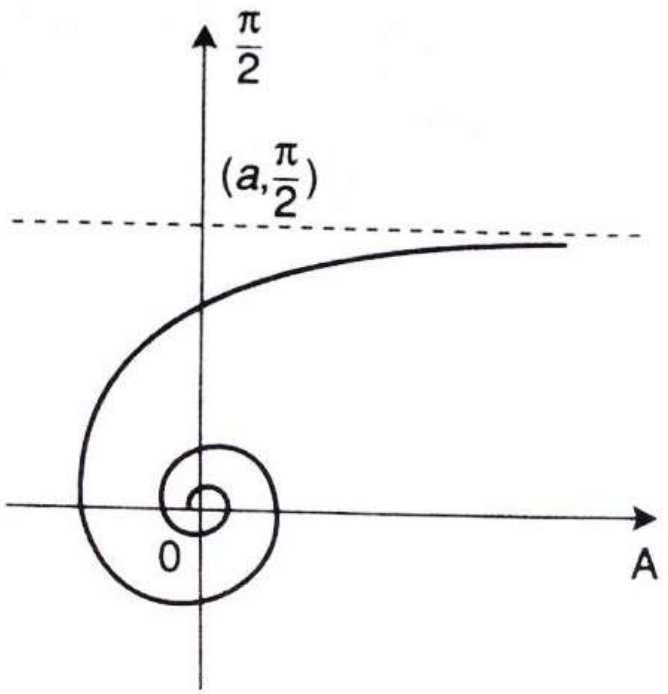
$r^2 = a^2 \operatorname{sen} 2\theta$



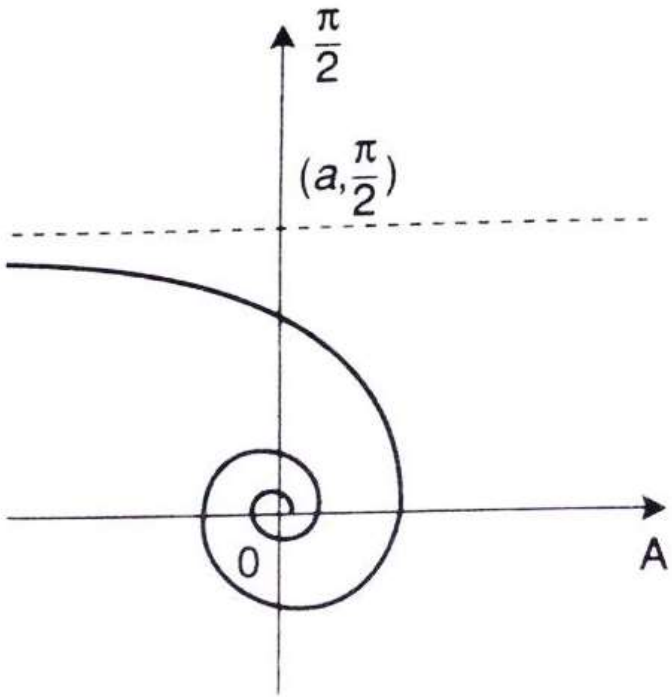
$r^2 = -a^2 \operatorname{sen} 2\theta$

Espirais

Espiral hiperbólica: $r\theta = a,\ \text{a} > 0$



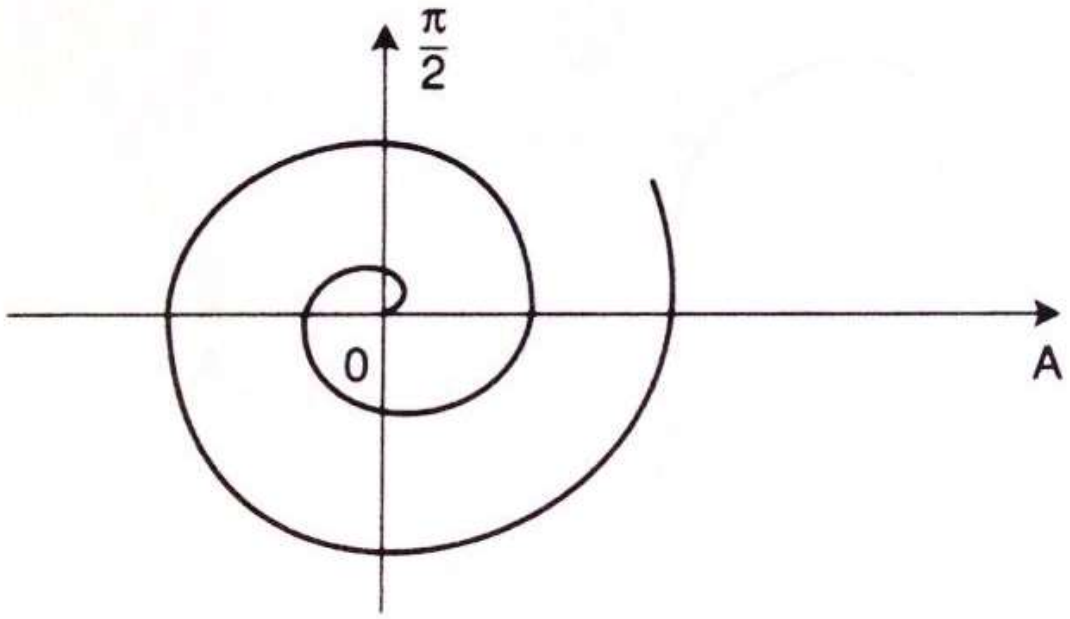
$r\theta = a\,(\theta>0)$



$r\theta = a\,(\theta<0)$

Espirais

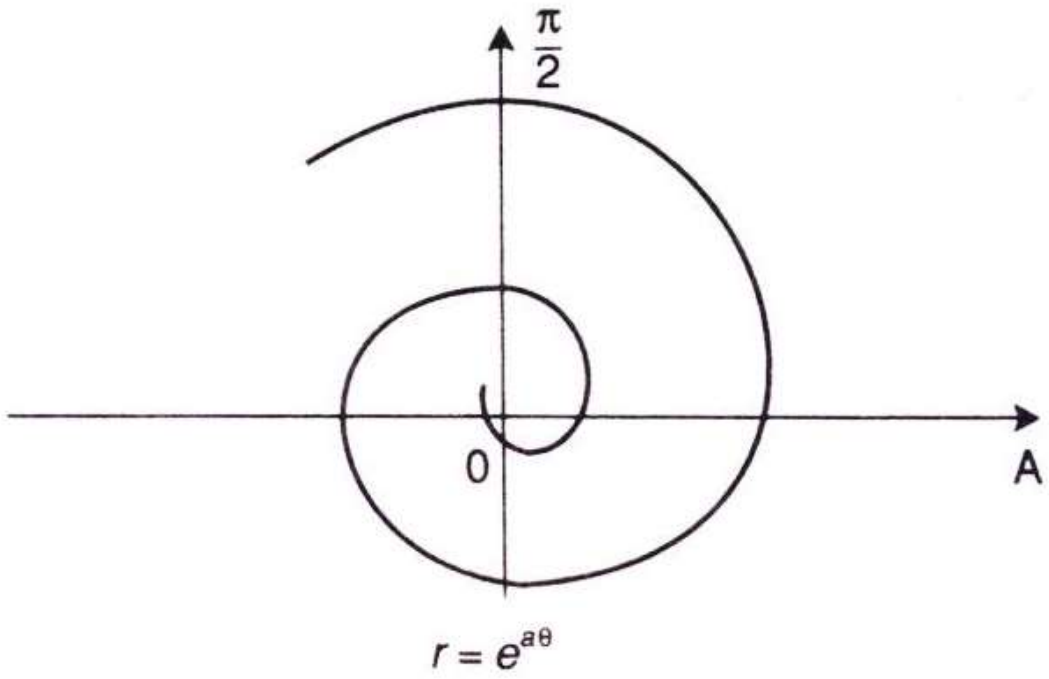
Espiral de Arquimedes: $r = a\theta,\ a > 0$



$r = a\theta (\theta \geq 0)$

Espirais

Espiral logarítmica: $r = e^{a\theta}$



Espirais

Espiral parabólica: $r^2 = \theta$