6.5 Graphs of Polar Equations

Day 2

IV. Limaçon Curves

- Any polar equation in the form of $r = a \pm b\sin\theta$ or $r = a \pm b\cos\theta$
- Called a ***LIMAÇON*** ("leemasahn" or "snail") ***CURVE***.
  - "leemasahn" or "snail"

Analyze $r = 2 - 3sin\theta$

Domain: $(-\infty, \infty)$

Range: [-1, 5]

Continuity: Yes

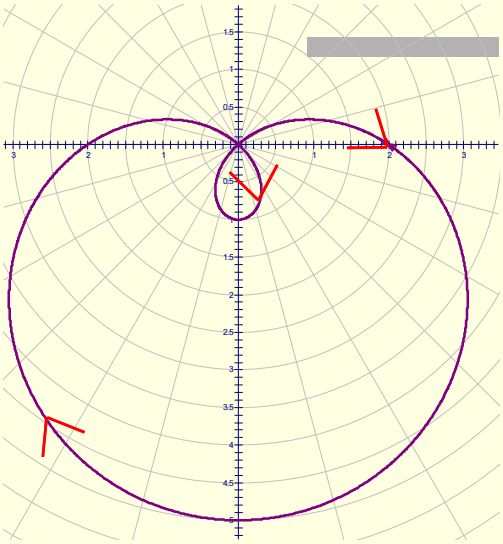
Symmetry: $y-$axis

Boundedness: BDD

Max r-values: 5

Asymptotes: None

Petals: None



IV. Limaçon Curves

In general- $r = a \pm b\sin\theta$

$r = a \pm b\cos\theta$

Domain: $(-\infty, \infty)$

Range: $[|a|-|b|,\ |a|+|b|]$

Continuity: Yes

Symmetry: $r = a \pm b\sin\theta$: y-axis

$r = a \pm b\cos\theta$: x-axis

Boundedness: BDD

Max r-values: $|a|+|b|$

Asymptotes: None

Petals: None

V. Lemniscate Curves

- Any polar equation in the form of $r^2 = a^2 sin2\theta$ or $r^2 = a^2 cos2\theta$
  - Called a ***LEMNISCATE CURVE***

Analyze: $r^2 = 4sin(2\theta)$ on $[0,2\pi]$

Domain: $\left[0,\frac{\pi}{2}\right] \cup \left[\pi,\frac{3\pi}{2}\right]$

Range: [-2, 2]

Continuity: Yes

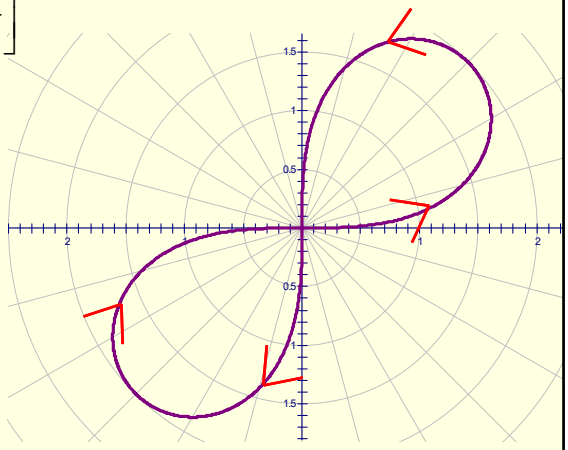
Sym.: origin

Boundedness: BDD

Max r-values: 2

Asymptotes: None

Petals: 2



V. Lemniscate Curves

In general- $r^2 = a\sin b\theta$

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

Too Difficult!!!

Each one will have a different domain

VI. The Spiral of Archimedes

The polar equation $r = \theta$ is called ***THE SPIRAL OF ARCHIMEDES***.

Analyze: $r = \theta$ on $[0, \infty)$

Domain: $[0, \infty)$

Range: $[0, \infty)$

Continuity: Yes

Sym.: None

Bound.: Below

Max r-values: None

Asym.: None

Petals: None