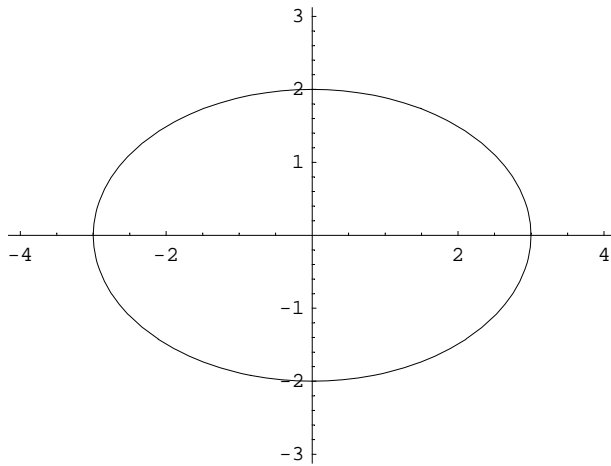```
Needs["Graphics`ImplicitPlot`"]
```

■

```
ImplicitPlot[x²/3² + y²/2² == 1, {x, -4, 4}, {y, -3, 3}, AxesOrigin -> {0, 0}]
```
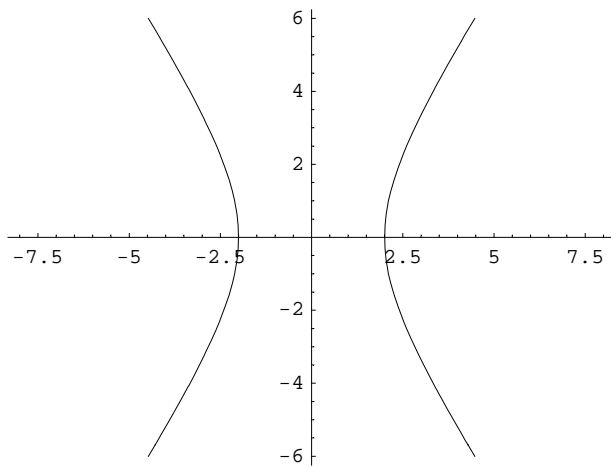


- ContourGraphics -

■

```
ImplicitPlot[ x²/2² - y²/3² == 1, {x, -8, 8}, {y, -6, 6}, AxesOrigin -> {0, 0}]
```


- ContourGraphics -

■ **Asteroid**

ImplicitPlot$\left[\text{Abs}[\mathbf{x}]^{\frac{2}{3}} + \text{Abs}[\mathbf{y}]^{\frac{2}{3}} == 2^{\frac{2}{3}}, \{\mathbf{x}, -2, 2\}, \{\mathbf{y}, -2, 2\}, \text{AxesOrigin} \to \{0, 0\}\right]$

- ContourGraphics -

∎
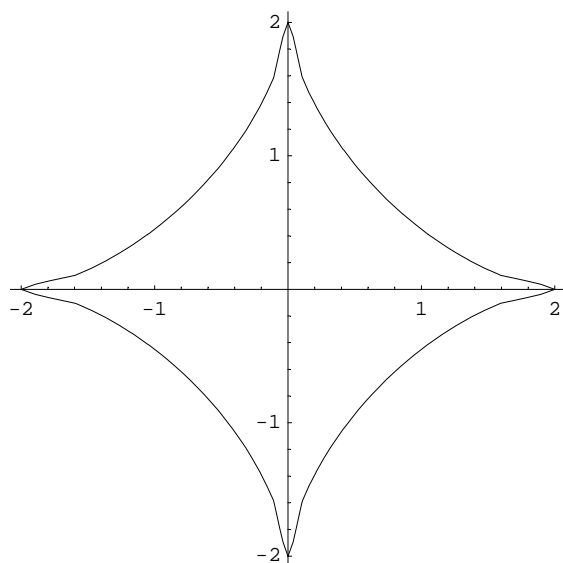
ImplicitPlot$\left[\left\{\frac{\mathbf{x}^2}{3^2} + \frac{\mathbf{y}^2}{2^2} == 1, \frac{\mathbf{x}^2}{2^2} + \frac{\mathbf{y}^2}{3^2} == 1\right\}, \{\mathbf{x}, -4, 4\}, \{\mathbf{y}, -3, 3\}, \text{AxesOrigin} \to \{0, 0\}\right]$
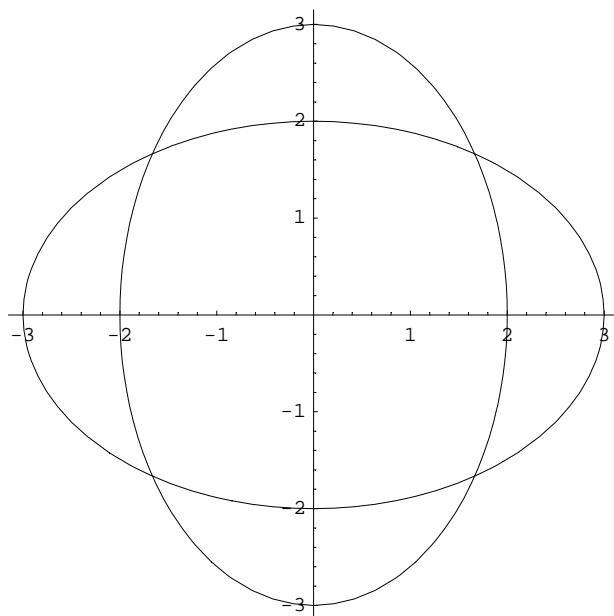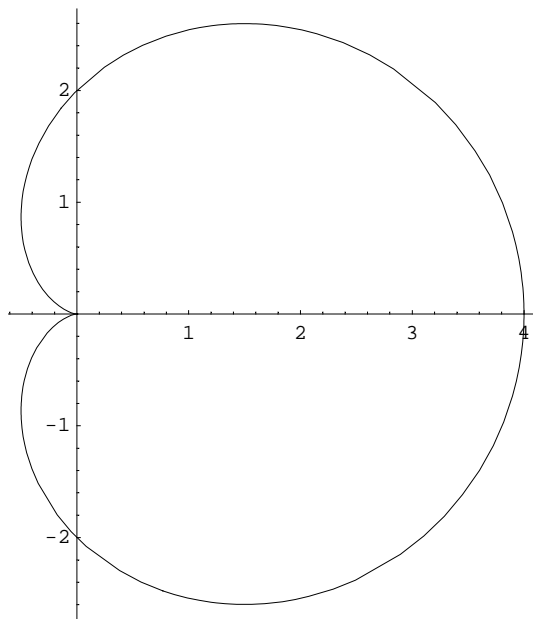
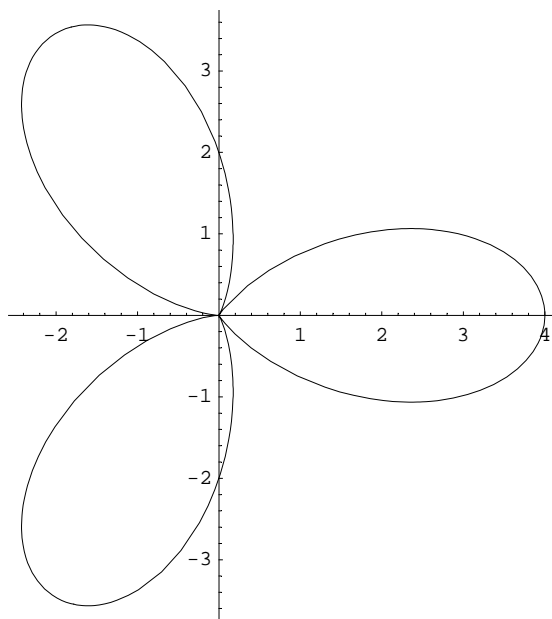- Graphics -

- Graphics -

Needs["Graphics`Graphics`"]

∎ **Cardioid**

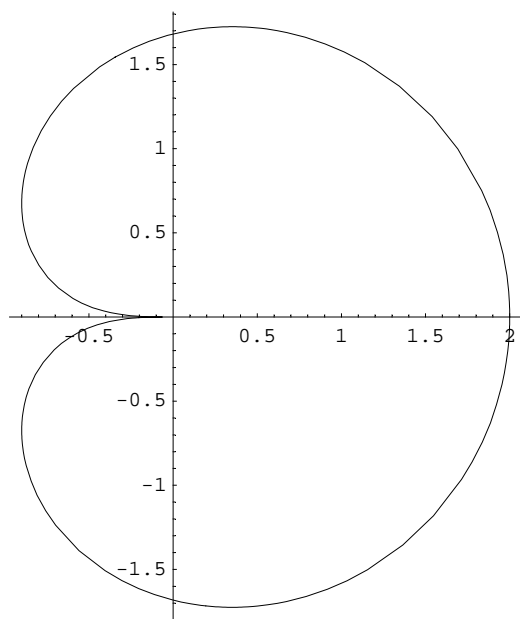**PolarPlot[r = 2 (1 + Cos[t]), {t, 0, 2 π}]**

- Graphics -

PolarPlot[r = 2 (1 + Cos[3 t]), {t, 0, 2 π}]

- Graphics -
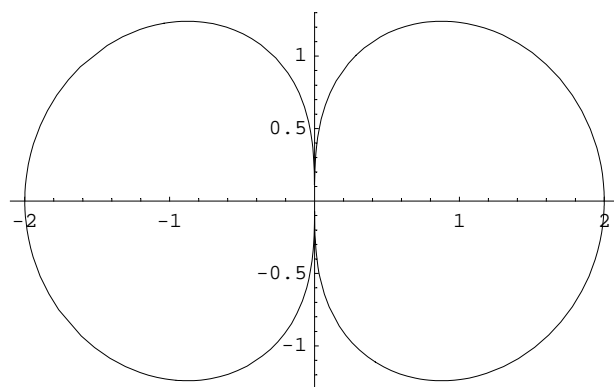
■ **Lemniscate**

$\texttt{PolarPlot}\big[\texttt{r} = 2\;\sqrt{\texttt{Abs[Cos[0.5\,t]]}}\;,\;\{\texttt{t, 0, 2}\,\pi\}\big]$

▪ Graphics ▪

$\texttt{PolarPlot}\big[\texttt{r} = 2\;\sqrt{\texttt{Abs[Cos[t]]}}\;,\;\{\texttt{t, 0, 2}\,\pi\}\big]$

▪ Graphics ▪

PolarPlot$\left[r = 2\sqrt{Abs[Cos[3\,t]]}\,,\,\{t,\,0,\,2\,\pi\}\right]$
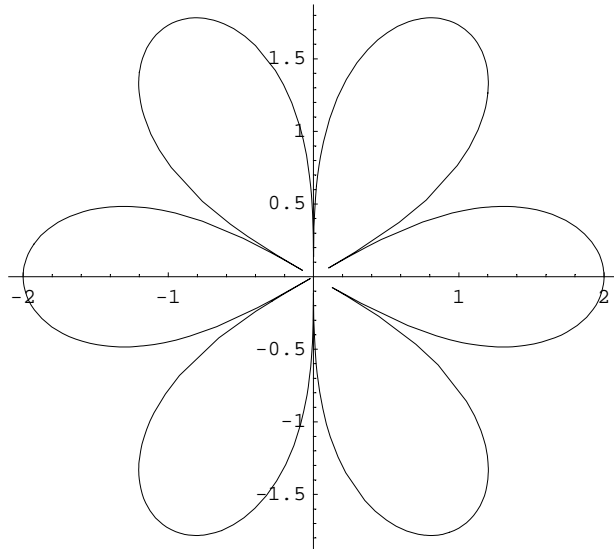
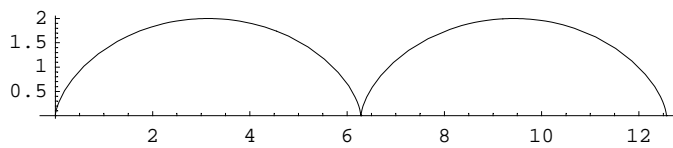- Graphics -

■ **Folium of Descartes**

ImplicitPlot[x³ + y³ - 6 x y == 0, {x, -4, 4}, {y, -5, 5}, AxesOrigin -> {0, 0}]
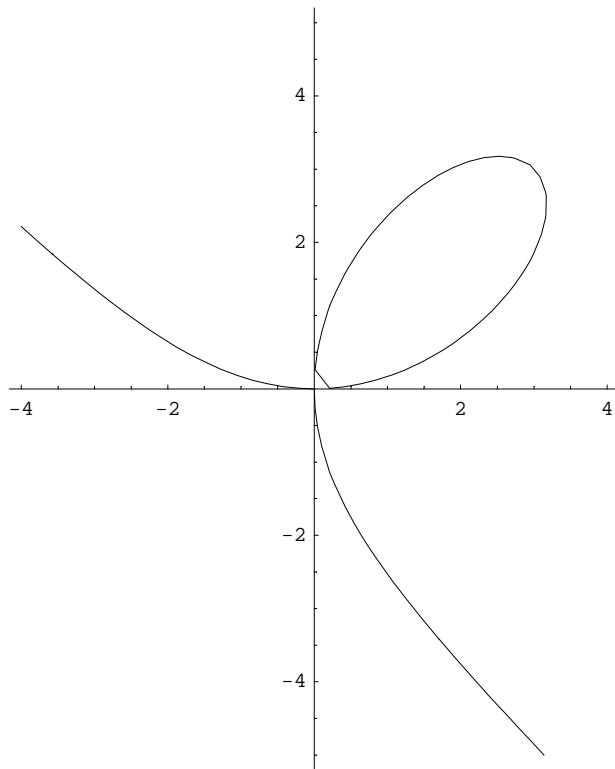
▪ ContourGraphics ▪

■ **Cycloid**

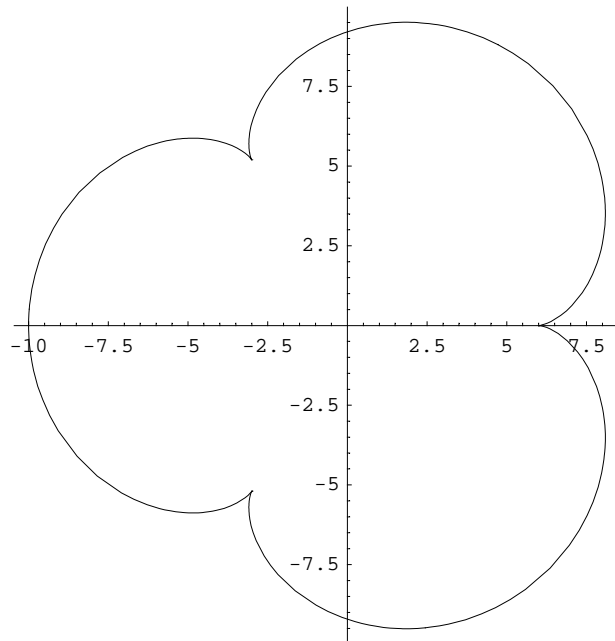**ParametricPlot[{(t - Sin[t]), (1 - Cos[t])}, {t, 0, 4 π}, AspectRatio → Automatic]**

▪ Graphics ▪

■ **Epicycloid**

```
b = 2; a = 3 b;
```

$$\text{ParametricPlot}\Big[\Big\{(a+b)\,\text{Cos}[t] - b\,\text{Cos}\Big[\frac{(a+b)\,t}{b}\Big],\ (a+b)\,\text{Sin}[t] - b\,\text{Sin}\Big[\frac{(a+b)\,t}{b}\Big]\Big\},$$
$$\{t,\ 0,\ 2\,\pi\},\ \text{AspectRatio} \rightarrow \text{Automatic}\Big]$$

- Graphics -

```
b = 2; a = 2 b;
```

$$\text{ParametricPlot}\Big[\Big\{(a + b)\,\text{Cos}[t] - b\,\text{Cos}\Big[\frac{(a + b)\,t}{b}\Big],\ (a + b)\,\text{Sin}[t] - b\,\text{Sin}\Big[\frac{(a + b)\,t}{b}\Big]\Big\},$$

$$\{t,\ 0,\ 2\,\pi\},\ \text{AspectRatio} \to \text{Automatic}\Big]$$
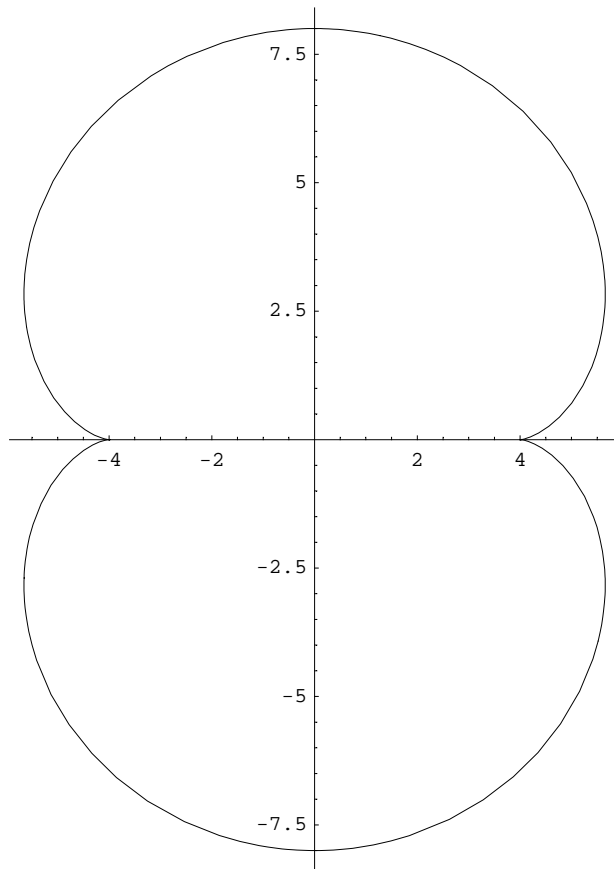
- Graphics -

```
b = 2; a = b;
```

$$\text{ParametricPlot}\Big[\Big\{(a+b)\,\text{Cos}[t] - b\,\text{Cos}\Big[\frac{(a+b)\,t}{b}\Big],\ (a+b)\,\text{Sin}[t] - b\,\text{Sin}\Big[\frac{(a+b)\,t}{b}\Big]\Big\},$$
$$\{t,\ 0,\ 2\,\pi\},\ \text{AspectRatio} \rightarrow \text{Automatic}\Big]$$
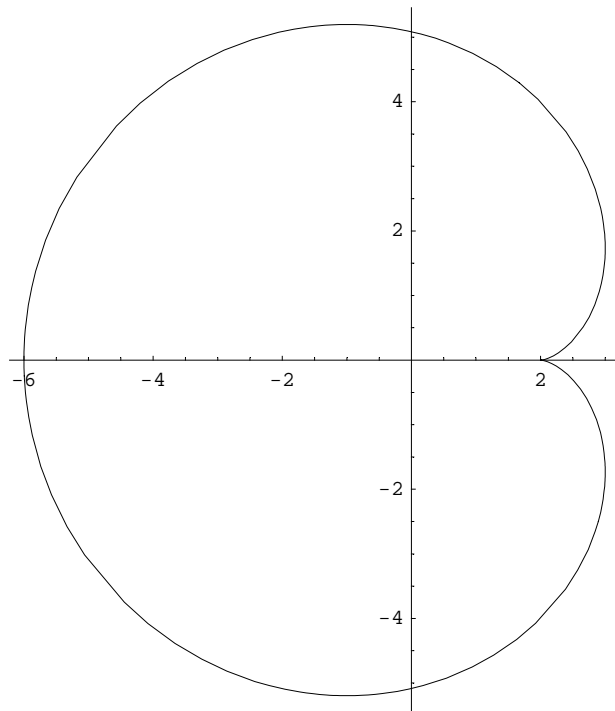
- Graphics -

```
b = 2; a = 10 b;
```

$$\mathbf{ParametricPlot}\left[\left\{(a+b)\ \mathbf{Cos}[t] - b\ \mathbf{Cos}\left[\frac{(a+b)\ t}{b}\right],\ (a+b)\ \mathbf{Sin}[t] - b\ \mathbf{Sin}\left[\frac{(a+b)\ t}{b}\right]\right\},\right.$$
$$\left.\{t,\ 0,\ 2\ \pi\},\ \mathbf{AspectRatio} \rightarrow \mathbf{Automatic}\right]$$
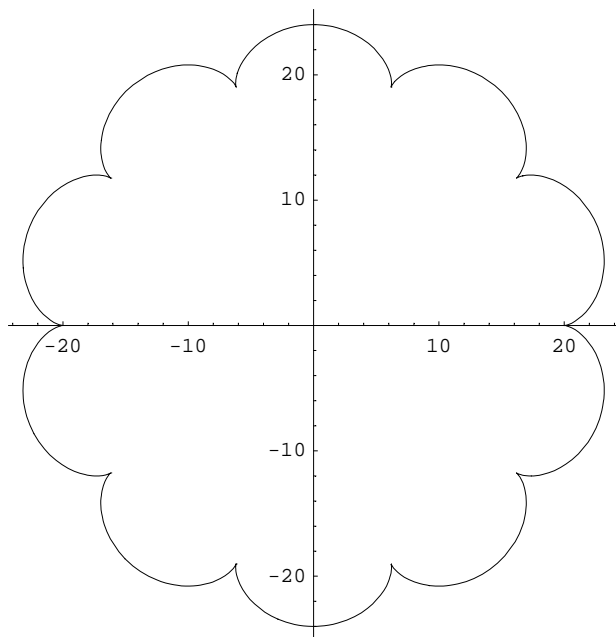
- Graphics -

■ **Hypocycloid**

```
b = 2; a = 3 b;
```

$$\mathbf{ParametricPlot}\left[\left\{(a-b)\ \mathbf{Cos}[t] + b\ \mathbf{Cos}\left[\frac{(a-b)\ t}{b}\right],\ (a-b)\ \mathbf{Sin}[t] - b\ \mathbf{Sin}\left[\frac{(a-b)\ t}{b}\right]\right\},\right.$$
$$\left.\{t,\ 0,\ 2\ \pi\},\ \mathbf{AspectRatio} \rightarrow \mathbf{Automatic}\right]$$
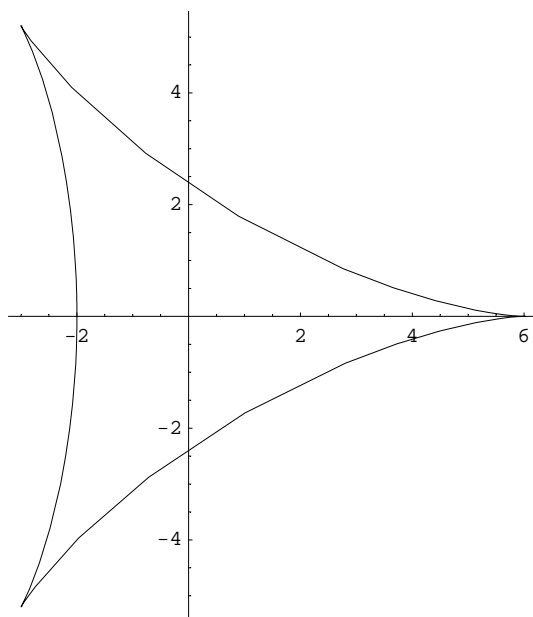
- Graphics -

```
b = 2; a = 2/3 π b;

ParametricPlot[{(a - b) Cos[t] + b Cos[(a - b) t / b], (a - b) Sin[t] - b Sin[(a - b) t / b]},
  {t, 0, 50 π}, AspectRatio → Automatic]
```
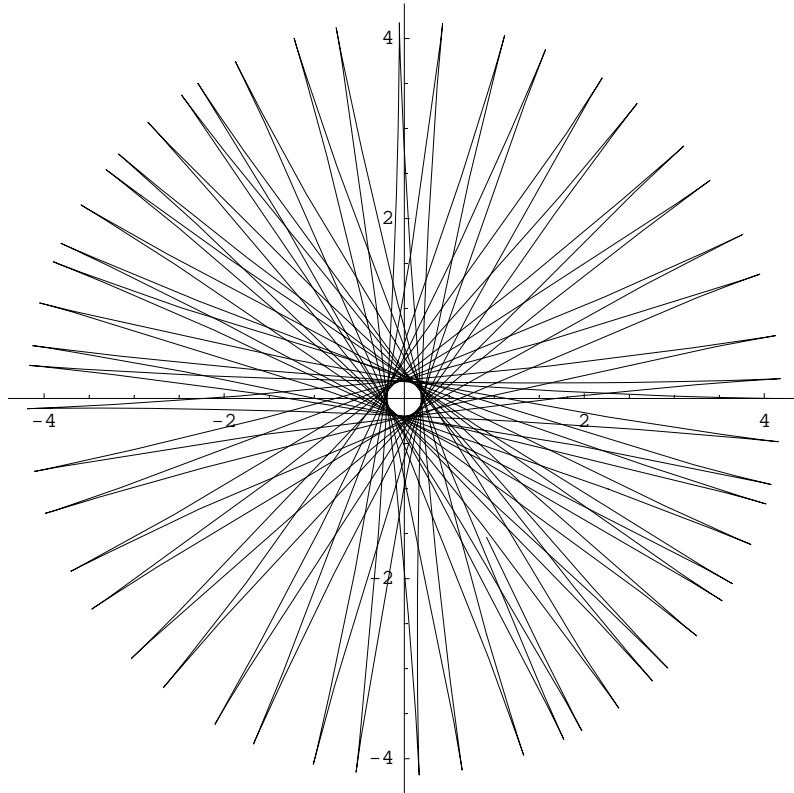

- Graphics -

```
b = 2; a = 10 b;
```

$$\texttt{ParametricPlot}\Big[\Big\{(a - b)\,\texttt{Cos}[t] + b\,\texttt{Cos}\Big[\frac{(a - b)\,t}{b}\Big],\ (a - b)\,\texttt{Sin}[t] - b\,\texttt{Sin}\Big[\frac{(a - b)\,t}{b}\Big]\Big\},$$

$$\{t,\ 0,\ 2\,\pi\},\ \texttt{AspectRatio} \rightarrow \texttt{Automatic}\Big]$$
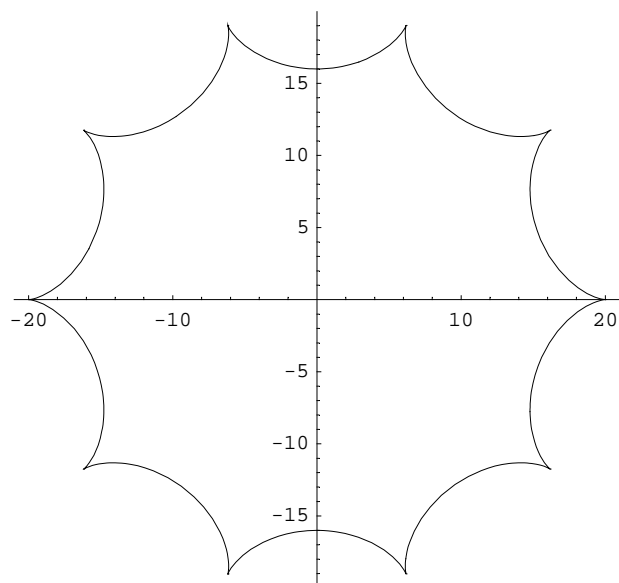
‣ Graphics ‣

■ **Asteroid**

$$\texttt{ParametricPlot}[\{2\,\texttt{Cos}[t]^3,\ 2\,\texttt{Sin}[t]^3\},\ \{t,\ 0,\ 2\,\pi\},\ \texttt{AspectRatio} \rightarrow \texttt{Automatic}]$$
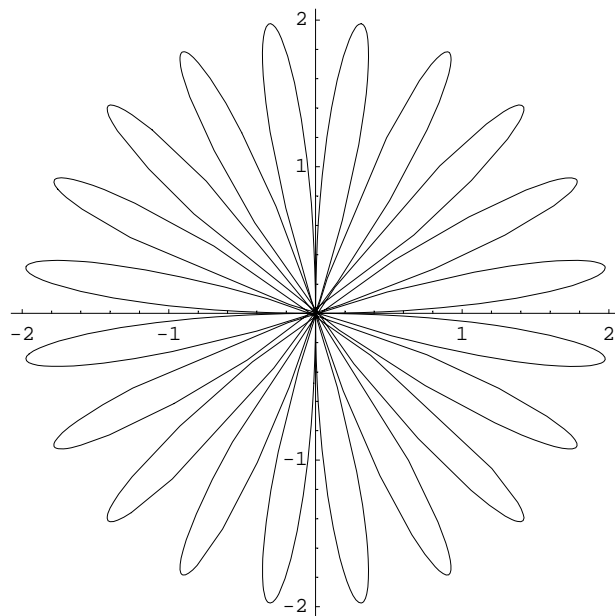

‣ Graphics ‣

■
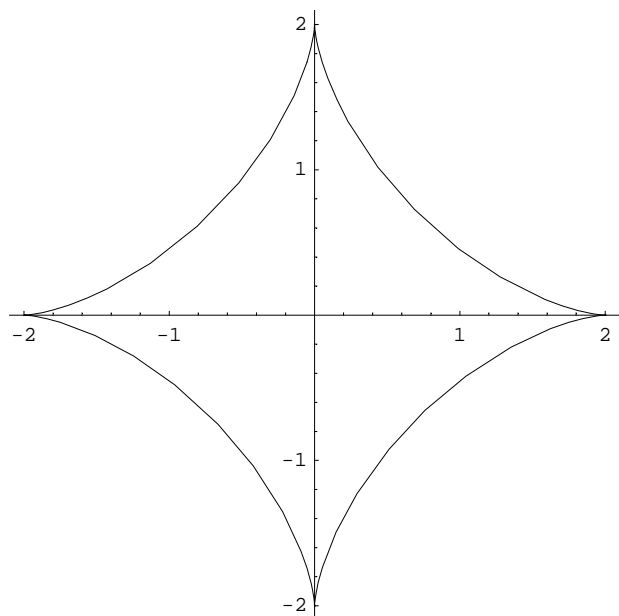
PolarPlot[{r = 1 + Cos[t], r = 1.5 + Cos[t], r = 0.5 + Cos[t]}, {t, 0, 2 π}]
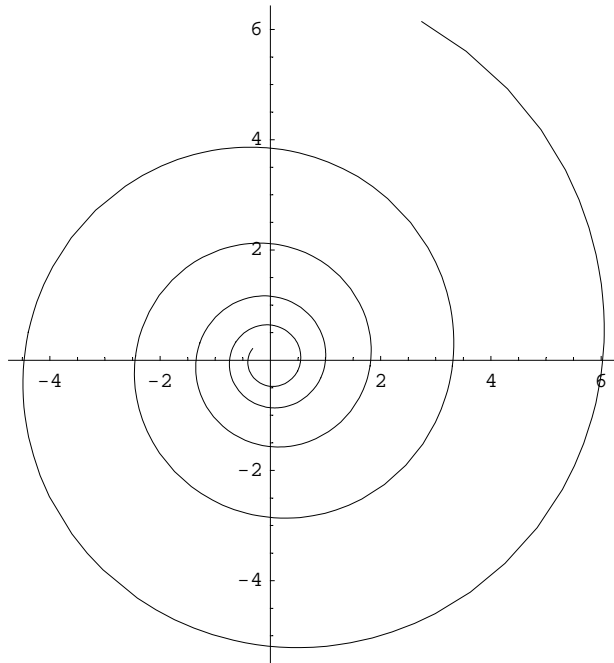

- Graphics -

∎
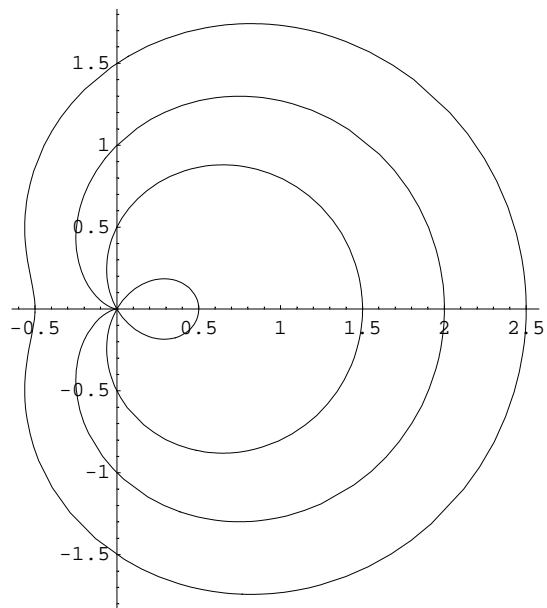
PolarPlot[2 Sin[10 t], {t, 0, 2 π}]
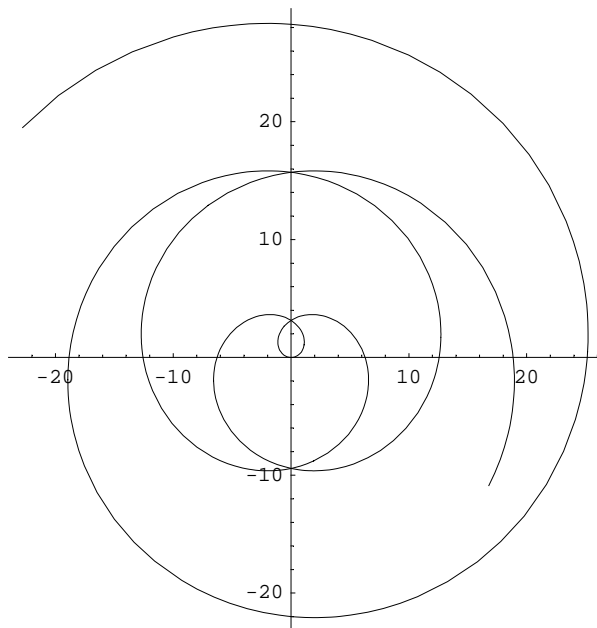

- Graphics -

∎ **Logarithmic Spiral**

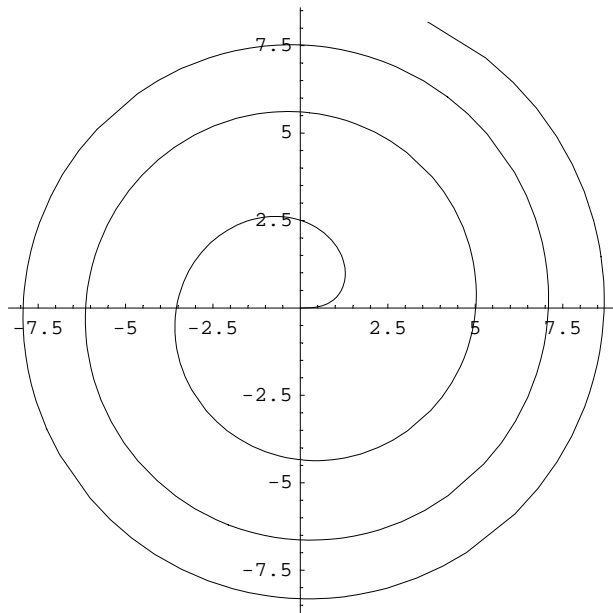**PolarPlot[1.1ᵗ, {t, -10, 20}]**

- Graphics -

■ **Spiral of Archimedes**

PolarPlot[2 t, {t, -10, 15}]

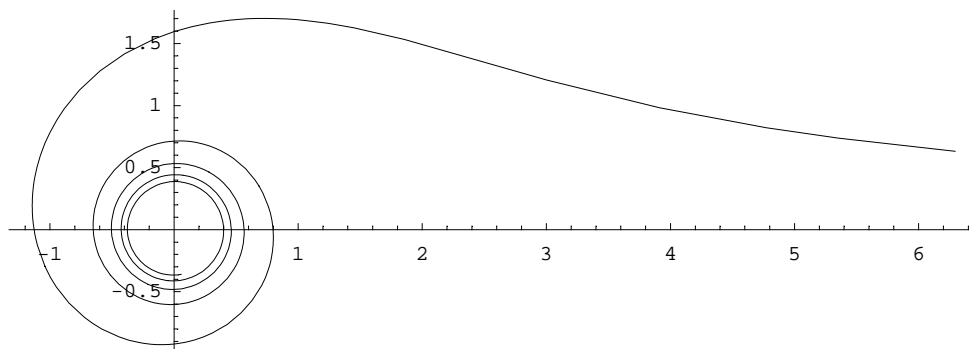
- Graphics -

■ **Parabolic Spiral**

PolarPlot$\left[2\sqrt{t}, \{t, 0, 20\}\right]$

- Graphics -

■ **Litnus**

PolarPlot$\left[\dfrac{2}{\sqrt{t}}, \{t, 0.1, 30\}, \text{PlotRange} \to \text{All}\right]$

- Graphics -