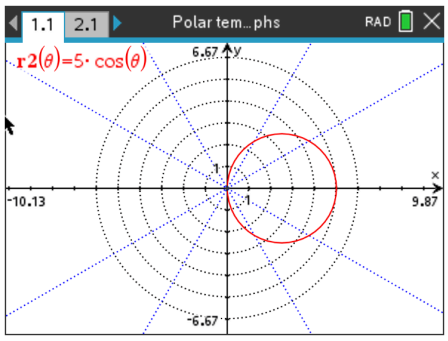
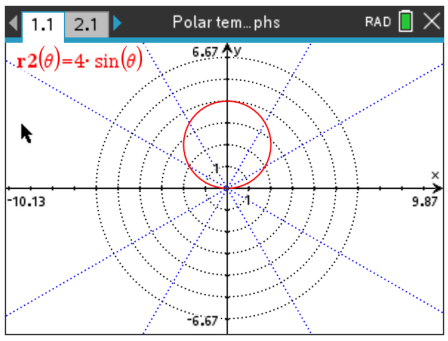
Special Types of Polar Functions

Here are some Polar Functions that it might be useful to recognize:

Circles

Function: $r(\theta) = a\cos\theta$ or $r(\theta) = a\sin\theta$

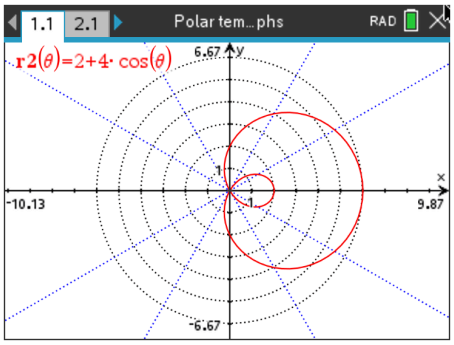




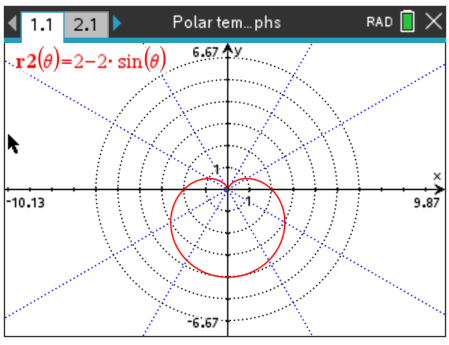
Limaçons

Function: $r(\theta) = a \pm b\cos\theta$ or $r(\theta) = a \pm b\sin\theta$ where $a > 0$ and $b > 0$

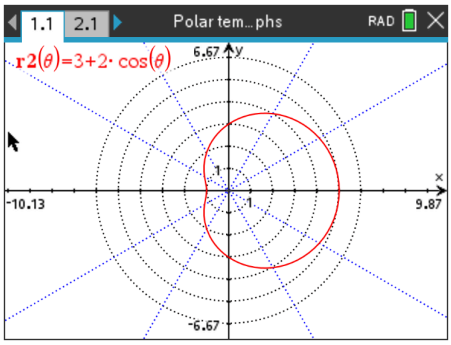
If $\frac{a}{b} < 1$, this will be a Limaçon with an inner loop.



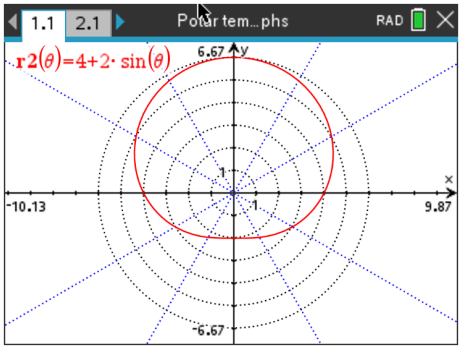
If $\frac{a}{b} = 1$, this will be a heart shaped Limaçon or a Cardioid.



If $1 < \frac{a}{b} < 2$, this will be a dimpled Limaçon.



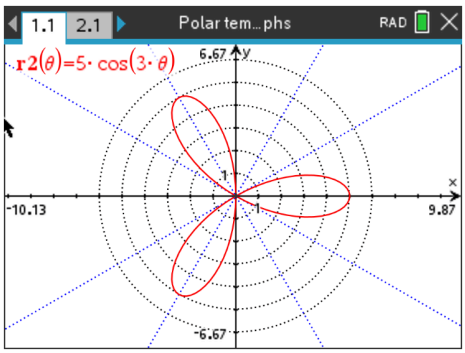
If $\frac{a}{b} \geq 2$, this will be a convex Limaçon.



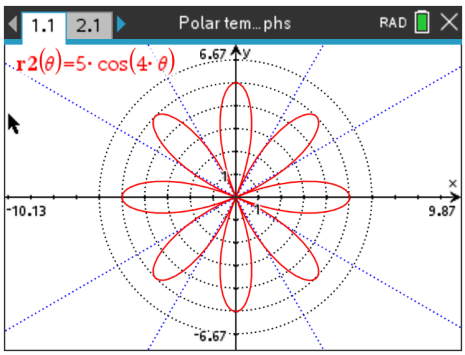
Rose Curves

n petals when *n* is odd, *2n* petals when *n* is even $(n \geq 2)$.

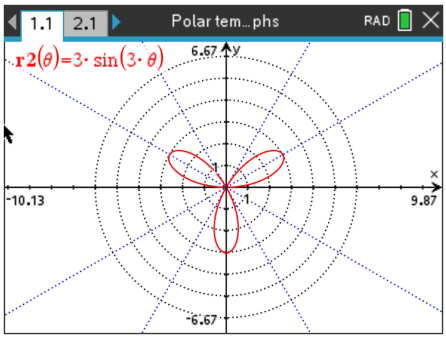
$r(\theta) = a\cos(n\,\theta)$ (odd *n*)



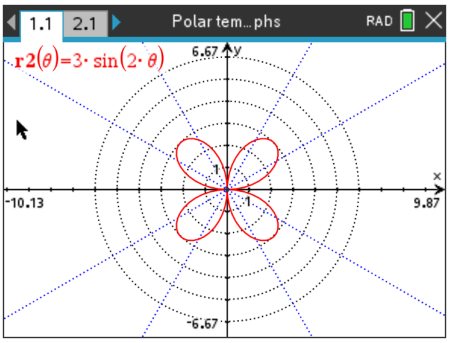
$r(\theta) = a\cos(n\theta)$ (even *n*)



$r(\theta) = a\,sin(n\,\theta)$ (odd *n*)



$r(\theta) = a\,sin\,(n\theta)$ (even *n*)



Archimedean Spiral

$r(\theta) = a \cdot \theta$