Math 1220 #28
Graphs of Polar Equations

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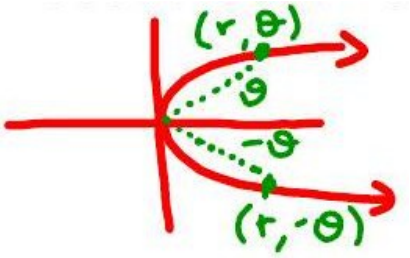
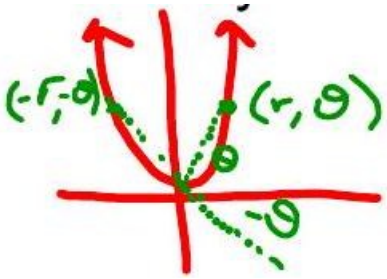
Symmetry

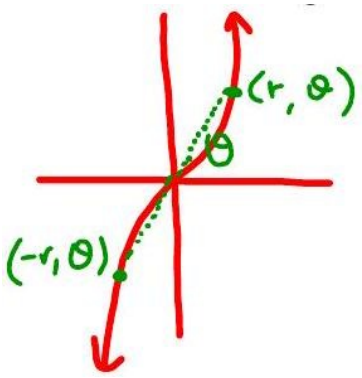
About the x-axis ⇒ replacing (r, θ) with $(r, -\theta)$ produces equivalent equation



About the y -axis ⇒ replacing (r, θ) with $(-r, -\theta)$ produces equivalent equation

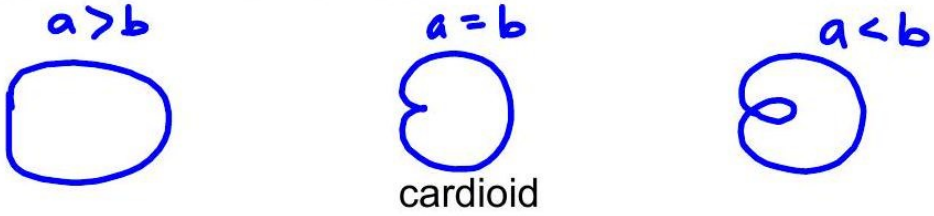


About the origin ⇒ replacing (r, θ) with $(-r, \theta)$ produces equivalent equation



Polar Equations

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

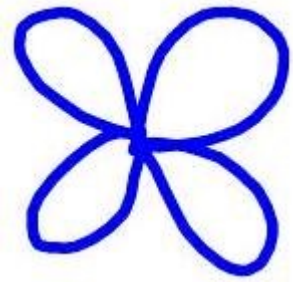


lemniscate

$r^2 = \pm a \cos(2\theta)$ $r^2 = \pm a \sin(2\theta)$

rose

$r = a\cos(n\theta)$ $r = a\sin(n\theta)$



n leaves if n odd

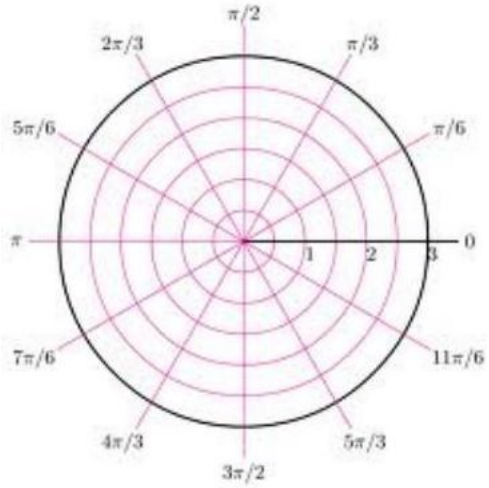
$2n$ leaves if n even

EX 1

Sketch a graph of the given polar equations.

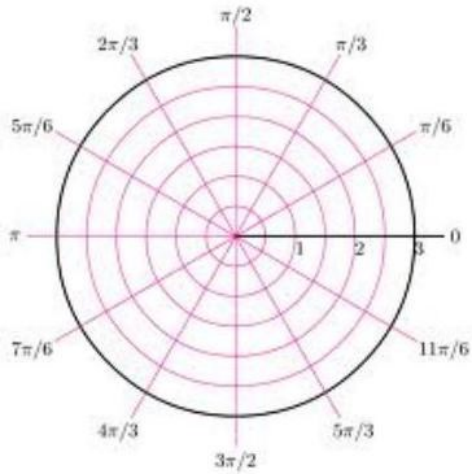
1a)

$r = 4\sin\ \theta$



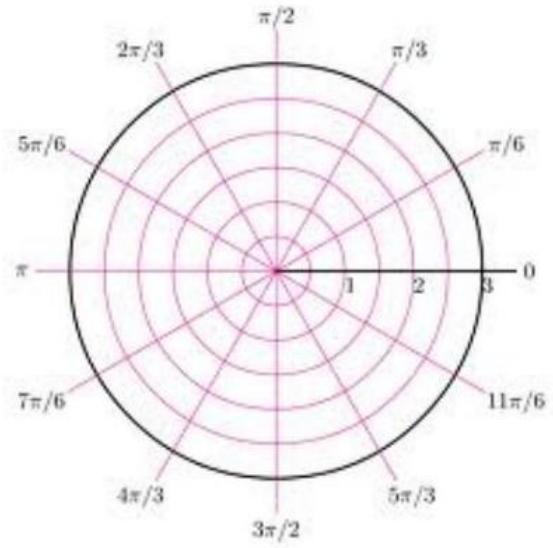
1b)

$r = -16\cos\ (2\theta)$



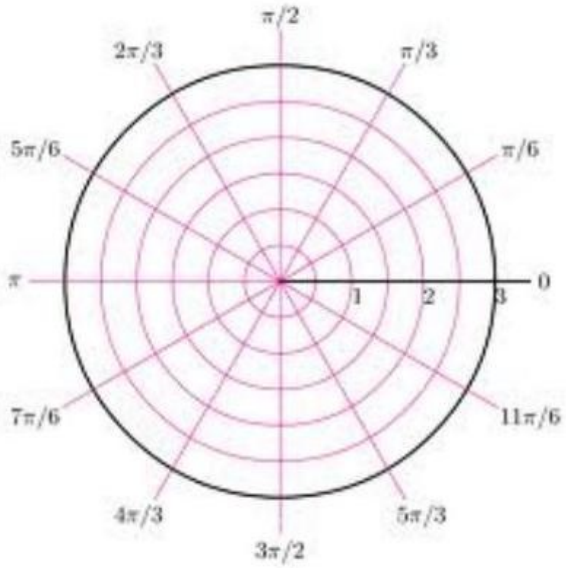
1c)

$r = 4 - 3\sin\ \theta$



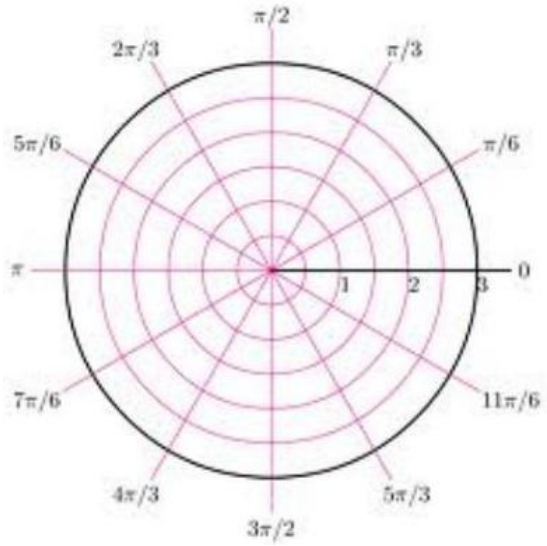
1d)

$r = 2\theta$



1e)

$r = \sqrt{2} - \sqrt{2}\sin\ \theta$



1f)

$r^2 = 4\cos\ (2\theta)$