PreCalculus

Section 9.7 Graphs of Polar Equations

WARM UP

Answer the following questions in your notes...

- What are the min and max values for the sine of any angle?

Cosine of any angle?

$[-1, 1]$

$[-1, 1]$

Jan 8-9:30 AM

9.7//Graphs of Polar Equations

p. 721, #26 (HW)

Example

Sketch the graph of $r=1-4\sin\theta$.

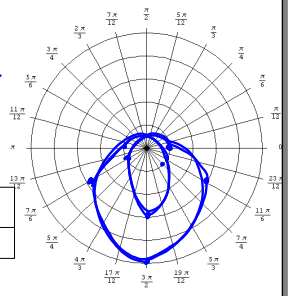
$1-4\sin 0$ $1-4\sin\pi$ $1-4\sin 2\pi$

$1-4\sin\frac{\pi}{6}$ $1-4\sin\frac{7\pi}{6}$

$1-4\sin\frac{\pi}{2}$ $1-4\sin\frac{3\pi}{2}$

$1-4\sin\frac{5\pi}{6}$ $1-4\sin\frac{11\pi}{6}$

θ	0	π/6	π/2	5π/6	π	7π/6	3π/2	11π/6	2π	
r	1	-1	-3	-1	1	3	5	3	1	



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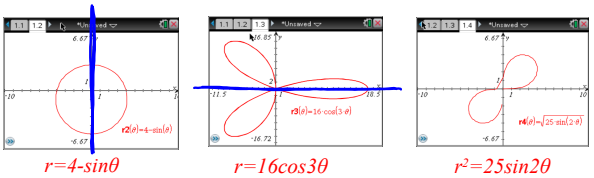
Feature #1 :: Symmetry (3 types)



$r=4-\sin\theta$ $r=16\cos 3\theta$ $r^2=25\sin 2\theta$

$\theta=\frac{\pi}{2}$ Polar axis The Pole

Jan 4-11:17 AM

Example

Decide which type of symmetry(s) the following graphs possess, if any.

$r=2\sin 3\theta$

$\theta=\frac{\pi}{2}$

$r=3\cot\theta$

$r=\frac{3}{\tan\theta}$

$\theta=\frac{\pi}{2}$, polar axis

The pole

p. 720, #16 (HW)

Jan 4-11:10 AM

Feature #2 :: Maximum value of |r| and zeros of r

Example

Find the maximum value of |r| and any zeros of r.

$r = 6 - 12\cos\theta$ -1 and 1 $[-1, 1]$

$r = 6 - 12(-1) = 18$

$r = 6 - 12(1) = -6$

max. value = 18

$6 - 12\cos\theta = 0$

$-12\cos\theta = -6$

$\cos\theta = \frac{1}{2}$

$\theta = \frac{\pi}{3}, \frac{5\pi}{3}$

p. 720, #19 (HW)

Jan 4-11:44 AM

Feature #3 :: Find an interval for theta for which the graph is traced only once.

Example

$r = 3 - 2\cos\theta$

2π

Jan 4-11:58 AM

HOMEWORK

pretty, pretty graphs

9.7a (p. 720): 13, 15, 16, 19, 20, 25, 26, 37, 38, 53, 54

Jan 4-12:00 PM

$r = 8\sin 5\theta$

$r = 0.5\theta$

$r = -0.1\theta$

Domain:

Range:

Jan 10-4:25 PM

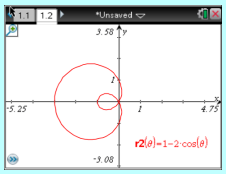
How to Do a Quick Test for Symmetry:

1)

2)

3) Check for more symmetry with a graph!

Find the symmetry for r = 1 - 2cosθ.



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