


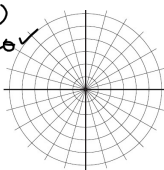
GO COUGARS! 

p 791 **Homework Questions**

In Exercises 7-12, test for symmetry with respect to $\theta = \pi/2$, the polar axis, and the pole.

7. $r = 5 + 4 \cos \theta$	8. $r = 16 \cos 3\theta$	polar axis (r, θ) $r^2 = 16 \cos(2\theta)$ $r^2 = 16 \cos(2\theta)$ ✓ $\theta = \frac{\pi}{2} \quad (-r, -\theta) \quad (r, \pi - \theta)$
9. $r = \frac{2}{1 + \sin \theta}$	10. $r = \frac{3}{2 + \cos \theta}$	
11. $r^2 = 16 \cos 2\theta$	12. $r^2 = 36 \sin 2\theta$	

In Exercises 17-40, sketch the graph of the polar equation using symmetry, zeros, maximum r -values, and any other additional points.

17. $r = 5$	18. $r = 2$	pole: (r, θ) $r^2 = 16 \cos 2\theta$ ✓
19. $r = \frac{\pi}{6}$	20. $r = -\frac{3\pi}{4}$	
21. $r = 3 \sin \theta$	22. $r = 4 \cos \theta$	
23. $r = 3(1 - \cos \theta)$	24. $r = 4(1 - \sin \theta)$	
25. $r = 4(1 + \sin \theta)$	26. $r = 2(1 + \cos \theta)$	
27. $r = 3 + 6 \sin \theta$	28. $r = 4 - 3 \sin \theta$	
29. $r = 1 - 2 \sin \theta$	30. $r = 1 - 2 \cos \theta$	
31. $r = 3 - 4 \cos \theta$	32. $r = 4 + 3 \cos \theta$	

Polar Graphs
Part 2

1. $r = 1 - 2 \sin \theta$	5. $r = 3 \sin \theta$	9. $r = 3 + 3 \cos \theta$
2. $r = 2 - 4 \cos \theta$	6. $\theta = \frac{7\pi}{6}$	10. $r = 4 \cos \theta$
3. $r = 2 + 2 \sin \theta$	7. $r = -3$	11. $\theta = -\pi$
4. $r = -2 \csc \theta$	8. $r = 2 - \cos$	12. $r = 4 \sec \theta$

$r^2 = 16 \cos(\pi - \theta)$
 $= 16 \cos \pi \cos \theta + \sin \pi \sin \theta$
 $r^2 = -16 \cos \theta$

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10.8 Graphs of Polar Equations - Day 3

Roses

Limniscates

May 8-7:26 AM

Roses

In general: $r = a \cos n\theta$ $r = a \sin n\theta$

if n is even, there are $2n$ petals

if n is odd, there are n petals

$|a|$ is the endpoint of the petals

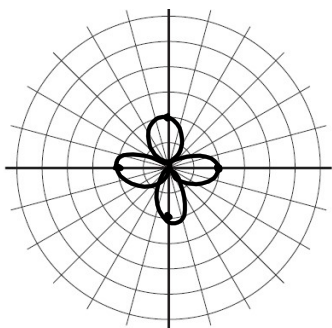
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$r = 2 \cos 2\theta$ 4 petals

$\cos 2\theta = \pm 1$ use ± 1 for n is even

$2\theta = 0, \pi, 2\pi, 3\pi$

$\theta = 0, \frac{\pi}{2}, \pi, \frac{3\pi}{2}$

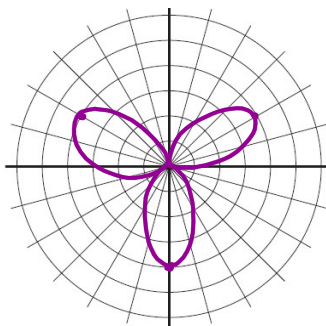


$r = 4 \sin 3\theta$ 3 petals

$\sin 3\theta = 1$ use 1 when n is odd

$3\theta = \frac{\pi}{2}, \frac{5\pi}{2}, \frac{9\pi}{2}$

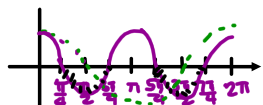
$= \frac{\pi}{6}, \frac{5\pi}{6}, \frac{9\pi}{6} = \frac{3\pi}{2}$



May 9-6:54 AM

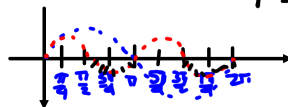
Lemniscate

$$r^2 = a^2 \cos 2\theta \Rightarrow r = \pm a\sqrt{\cos 2\theta}$$



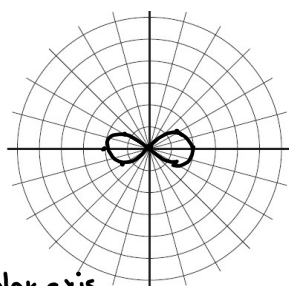
$$0 \leq \theta \leq \frac{\pi}{4}, \frac{3\pi}{4} \leq \theta \leq \frac{5\pi}{4}, \frac{7\pi}{4} \leq \theta \leq 2\pi$$

$$r^2 = a^2 \sin 2\theta \Rightarrow r = \pm a\sqrt{\sin 2\theta}$$



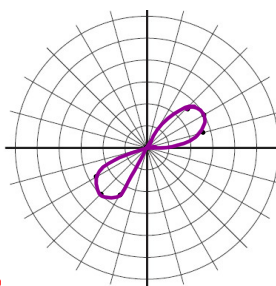
$$0 \leq \theta \leq \frac{\pi}{2}, \pi \leq \theta \leq \frac{3\pi}{2}$$

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



θ	r
0	2
$\frac{\pi}{4}$	0
$\frac{\pi}{2}$	0
$\frac{3\pi}{4}$	0
π	0
$\frac{5\pi}{4}$	$\sqrt{2} = 1.4$
$\frac{3\pi}{2}$	2
$\frac{7\pi}{4}$	$\sqrt{2}$

$$r^2 = 9 \sin 2\theta$$



θ	r
0	0
$\frac{\pi}{4}$	2.79
$\frac{\pi}{2}$	3
$\frac{3\pi}{4}$	0
π	0
$\frac{5\pi}{4}$	2.79
$\frac{3\pi}{2}$	3

polar axis
($r, -\theta$)

on polar axis \sqrt{a} circle

on $\theta = \frac{\pi}{4}$

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HOMWORK



p 791 1-6 all, 33-40 all

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