Warm up

1. Convert from rectangular to polar and give 3 equivalent points.

$(1,-1)$ $\left(\sqrt{2}, \frac{7\pi}{4}\right)$ $\left(\sqrt{2}, \frac{\pi}{4}\right)$ $\left(-\sqrt{2}, \frac{3\pi}{4}\right)$ $\left(\sqrt{2}, \frac{15\pi}{4}\right)$

2. Convert from a polar equation to a rectangular equation.

a. r = 5

$x^2+y^2=25$

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

$(x-2)^2 - 4 + y^2 = 0$ $x^2+y^2 = 4x$

$x^2-4x+2^2+y^2 = 0+4$

c. $\theta = -\frac{\pi}{3}$ $y = -\sqrt{3}x$

3. Convert from a rectangular equation to a polar equation.

x = 3

$r\cos\theta = 3$

$r = 3\sec\theta$

Apr 23-9:28 AM

GO COUGARS!

p 783 Homework Questions

In Exercises 33–48, convert the rectangular equation to polar form. Assume $a > 0$.

33. $x^2 + y^2 = 9$
35. $y = 4$
37. $x = 10$
39. $3x - y + 2 = 0$
41. $xy = 16$
43. $y^2 - 8x - 16 = 0$
45. $x^2 + y^2 = a^2$
47. $x^2 + y^2 - 2ax = 0$

$y^2\sin^2\theta - 8r\cos\theta - 16 = 0$

$y^2 = r^2 - x^2$

$r = \frac{8\cos\theta \pm \sqrt{64\cos^2\theta - 4(\sin^2\theta)(16)}}{2\sin^2\theta}$

$= \frac{8\cos\theta \pm 8}{2\sin^2\theta}$

$\frac{4(\cos\theta \pm 1)}{\sin^2\theta}$

$r^2 - x^2 = 8x + 16$

$r^2 = x^2 + 8x + 16$

$r^2 = (x+4)^2$

$r = x+4$

$r = r\cos\theta + 4$

$r(1-\cos\theta) = 4$

$r = \frac{4}{1-\cos\theta}$

In Exercises 49–64, convert the polar equation to rectangular form.

49. $r = 4\sin\theta$
51. $\theta = \frac{2\pi}{3}$
53. $r = 4$
55. $r = 4\csc\theta$
57. $r^2 = \cos\theta$
59. $r = 2\sin 3\theta$
61. $r = \frac{2}{1+\sin\theta}$
63. $r = \frac{6}{2-3\sin\theta}$

$r \cdot r = 4r\sin\theta$

$r^2 = 4y$

$x^2+y^2-4y = 0$ cs.

$r^3 = r\cos\theta$

$r = (r\cos\theta)^{\frac{1}{3}}$

$r^2 = (r\cos\theta)^{\frac{3}{3}}$

$x^2+y^2 = x^{\frac{3}{3}}$

$r^3 = x$

$r = \sqrt{x^2+y^2}$

$\left(\sqrt{x^2+y^2}\right)^3 = x$

$x^2+y^2 = x^{\frac{3}{3}}$

$r + r\sin\theta = 2$

$r + y = 2$

$r = 2 - y$

$r^2 = 4 - 4y + y^2$

$x^2+y^2 = 4 - 4y + y^2$

$x^2 + 4y - 4 = 0$

$2r - 3r\sin\theta = 6$

$2r - 3y = 6$

$2r = 3y + 6$

$4r^2 = 9y^2 + 36y + 36$

$4(x^2+y^2) =$

$r^2 + ry = 2r$

$x^2+y^2 = r(2-y)$

$\theta\left(\frac{x^2+y^2}{2-y}\right)^2 = r^2$

Feb 2-9:51 PM

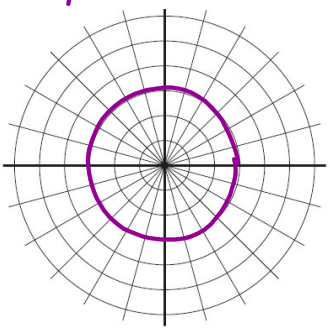
10.8 Graphs of Polar Equations

Apr 19-10:08 AM

$r = 3$

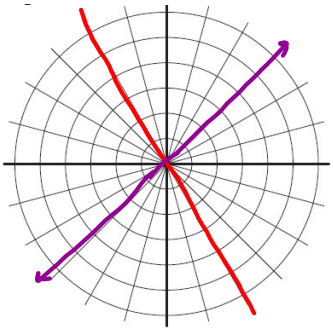
$r^2 = 9$

$x^2 + y^2 = 9$



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

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



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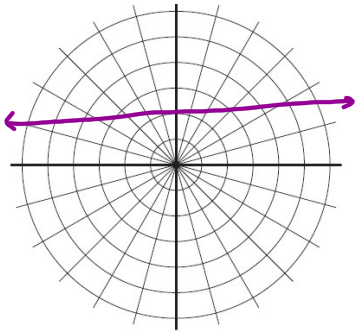
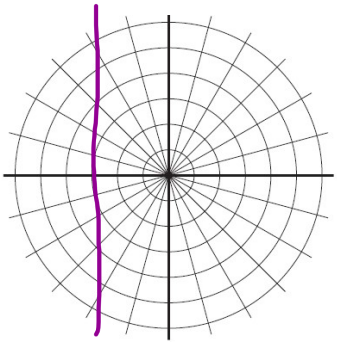
$r\sin\theta = 2$

$y = 2$



$r\cos\theta = -3$

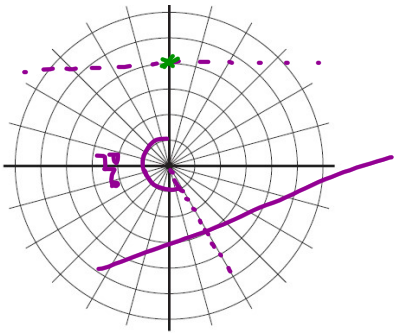
$x = -3$



Apr 19-10:09 AM

$r\sin\left(\theta - \frac{7\pi}{6}\right) = 4$

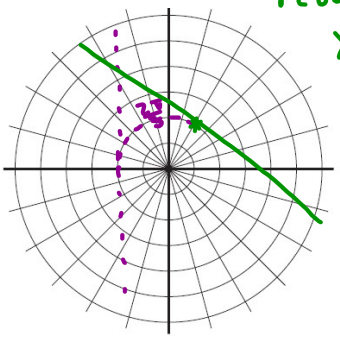
$r\sin\theta = 4$



$r\cos\left(\theta + \frac{2\pi}{3}\right) = -2$

$r\cos\theta = -2$

$x = -2$



Apr 19-10:09 AM

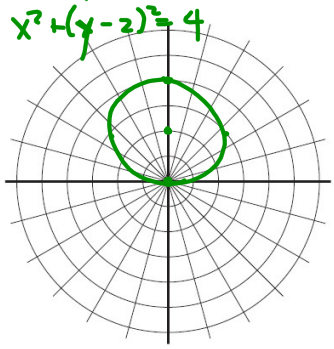
$r = 4\sin\theta$

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

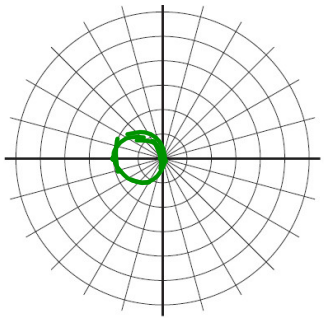
$x^2 + y^2 = 4y$

$x^2 + (y^2 - 4y + 4) = 4$

$x^2 + (y-2)^2 = 4$



$r = -2\cos\theta$



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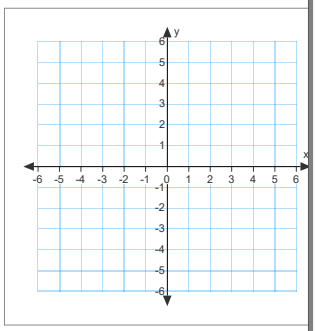
Polar Symmetry

Symmetry over the polar axis (x-axis)

rectangular: (x, y)

polar: (r, θ)



Symmetry over $\theta = \frac{\pi}{2}$ (y-axis)

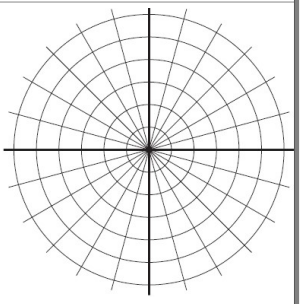
rectangular: (x, y)

polar: (r, θ)

Symmetry over the pole (origin)

rectangular: (x, y)

polar: (r, θ)



May 5-12:56 PM

Testing for polar symmetry

$r = 3 + 2\cos\theta$

polar axis - substitute $-\theta$ for θ

$\theta = \frac{\pi}{2}$ - substitute $-r$ and $-\theta$

pole - substitute $-r$

May 6-6:17 AM

HOMEWORK

p 784 65-70 all

p 791 7-11 odd, 17-22 all ← graph only

Workbook p 100 Part 1

1-6, 10, 12

Feb 2-9:51 PM