Warm up

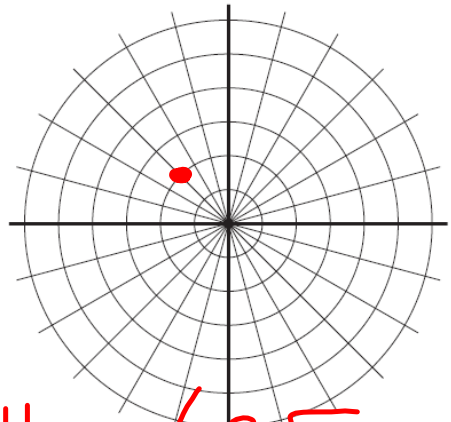
1. Name 3 other polar coordinates for the one given within the given parameters:

$\left(2, \frac{3\pi}{4}\right)$

a. $r < 0,\ 0 \le \theta < 2\pi$

b. $r > 0,\ 2\pi \le \theta < 4\pi$

c. $r > 0,\ -2\pi \le \theta < 0$



2. Convert the polar coordinate to a rectangular coordinate. $\left(-3, \frac{11\pi}{6}\right)$

$x = r\cos\theta$ $\quad x = -3\cos\frac{11\pi}{6} = \left(\frac{-3\sqrt{3}}{2}, \frac{3}{2}\right)$

$y = r\sin\theta$ $\quad y = -3\sin 11\pi/6$

3. Convert the rectangular coordinate to a polar coordinate. $\left(\sqrt{3}, -1\right)$

$r = \sqrt{(\sqrt{3})^2 + (-1)^2}$ $\quad$ Q4

$r = \sqrt{4} = 2$ $\quad \left(2, \frac{11\pi}{6}\right)$

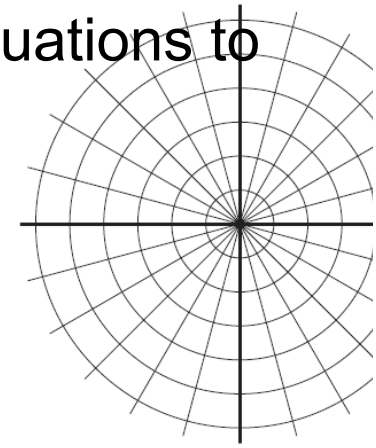
$\tan\theta = \frac{-1}{\sqrt{3}}$ $\quad \theta = \frac{11\pi}{6}$

9.6 Day 2

Conversions of non-common angles

Converting Polar Equations to Rectangular Equations

Converting Rectangular Equations to Polar Equations



Non-common angles - calc only!

polar to rectangular

$(5, 177°)$

Use $x = r\cos\theta$

$y = r\sin\theta$

$x = 5\cos 177°$

$y = 5\sin 177°$

$(-5, .26)$

rectangular to polar

(-4,-5)

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

$\tan\theta = \frac{y}{x}$

$r = \sqrt{16+25} = \sqrt{41}$

$= 6.4$

$\tan\theta = \frac{5}{4}$

$\theta = 51.3$

$\theta = 231.3$

$(6.4, 231.3°)$

Converting Polar equations to Rectangular Equations

1. $r = -2$

$r^2 = 4$

$\boxed{x^2 + y^2 = 4}$

circle w/ radius 2

2. $\left(r = -2\sin\theta\right)$

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

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

$x^2 + y^2 + 2y + ___ = ___$

$x^2 + y^2 + 2y + 1 = 1$

$\boxed{x^2 + (y+1)^2 = 1}$

$$x^2 + y^2 = r^2$$

$$x = r\cos\theta$$

$$y = r\sin\theta$$

3. $r = -3\cos\theta - 2\sin\theta$

$r^2 = -3r\cos\theta - 2r\sin\theta$

$x^2 + y^2 = -3x - 2y$

$x^2 + 3x + \underline{\frac{9}{4}} + y^2 + 2y + \underline{1} = \underline{\frac{9}{4} + 1}$

$\left(x + \frac{3}{2}\right)^2 + (y+1)^2 = 13/4$

4. $r = 3\sec\theta$

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

$r\cos\theta = 3$ $\boxed{x = 3}$

5. $\theta = \frac{\pi}{6}$

$\tan\theta = \tan\frac{\pi}{6}$

$x \cdot \frac{y}{x} = \frac{1}{\sqrt{3}} \cdot x$

$y = \frac{1}{\sqrt{3}}x$

Rectangular Equations to Polar Equations

6. $x = 2$

$r\cos\theta = 2$

$r = \dfrac{2}{\cos\theta}$

$r = 2\sec\theta$

7. $2x - 3y = 5$

$2r\cos\theta - 3r\sin\theta = 5$

$r(2\cos\theta - 3\sin\theta) = 5$

$r = \dfrac{5}{2\cos\theta - 3\sin\theta}$

8. $(x-3)^2 + y^2 = 9$

$x^2 - 6x + 9 + y^2 = 9$

$x^2 - 6x + y^2 = 0$

$r^2 - 6x = 0$

$r^2 = 6r\cos\theta$

$r = 6\cos\theta$

Homework

p711 ~~13-17 odd~~ 13, 17

p712 ~~21-27~~ 23 odd, ~~31-41 odd~~ 37, 39,

~~43-55 odd (omit #53)~~ 43-49odd, 55, 61-67 odd