Friday we took notes on how to plot Polar Points. We will review briefly (1 example). The weebly will be updated this afternoon with the stuff from Friday. No homework was assigned.

Sit and be quiet please!!!!

Ex $\left(-3, \frac{-5\pi}{4}\right) \rightarrow (r, \theta)$

start on neg. x-axis

clockwise $\frac{5\pi}{4}$ radians

direction

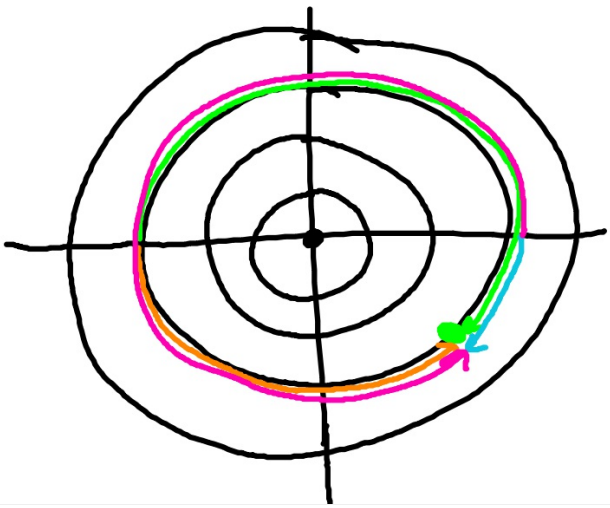
how much to turn not where to go

$\left(-3, \frac{-5\pi}{4}\right)$

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

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

$\left(3, \frac{7\pi}{4}\right)$



$x^2+y^2=r^2$ $\quad \tan\theta = \frac{y}{x}$

$x = r\cos\theta$

$y = r\sin\theta$

polar $(r,\theta) \rightarrow$ rectangular (x,y)

$x = r\cos\theta$

$y = r\sin\theta$

rectangular $(x,y) \rightarrow$ polar (r,θ)

$x^2+y^2=r^2$ $\quad \tan\theta = \frac{y}{x}$

Ex convert to rect. form

A. $(2, \pi) \rightarrow (x, y)$

r, θ

$x = r\cos\theta$

$x = 2\cos\pi$

$x = 2(-1)$

$x = -2$

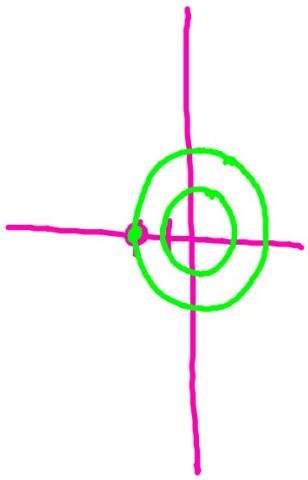
$y = r\sin\theta$

$y = 2\sin\pi$

$y = 2(0)$

$y = 0$

$(-2, 0)$



B. $\left(\sqrt{3}, \frac{\pi}{6}\right)$

$x = \sqrt{3}\cos\frac{\pi}{6}$

$x = \sqrt{3}\left(\frac{\sqrt{3}}{2}\right)$

$x = \frac{3}{2}$

$y = \sqrt{3}\sin\frac{\pi}{6}$

$y = \frac{\sqrt{3}}{2}$

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

Ex. Convert from rectangular to polar.

A. $(-1, 1) \rightarrow (r, \theta)$

(x, y)

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

$(-1)^2 + (1)^2 = r^2$

$r = \pm\sqrt{2}$

$r = \sqrt{2}$

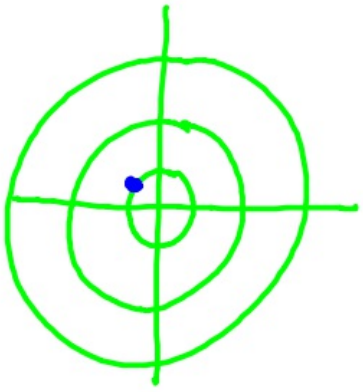
$\tan\theta = \frac{y}{x}$

$\tan\theta = \frac{1}{-1}$

$\tan\theta = -1$

Q2

$\theta = \frac{3\pi}{4}$



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

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

$\left(\sqrt{2}, -\frac{5\pi}{4}\right)$

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

B. $(0,2)$

$0^2+(2)^2=r^2$

$\sqrt{4}=\sqrt{r^2}$

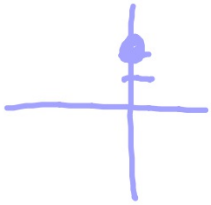
$r=\pm 2$

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

$\tan\theta = \frac{2}{0}$

$\tan\theta = \text{undef}$

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



Converting Equations from P → R

A. $(r)^2 = (2)^2$

circle
r = #

$r^2 = 4$

$x^2 + y^2 = 4$

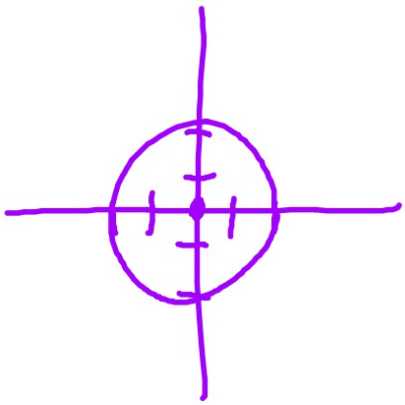
$x = r\cos\theta$

$y = r\sin\theta$

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

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

Circle
C: (0,0)
r = 2



B. $\theta = \frac{\pi}{3}$

$x = r\cos\theta$

$y = r\sin\theta$

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

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

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

$y = \sqrt{3}x$

"$y = mx + b$"

C. $r = \sec\theta$

$x = r\cos\theta$

$y = r\sin\theta$

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

$1 = r\cos\theta$

$1 = x$

$x = 1$ vertical line!!!!

D. $r \cdot r = 4\cos\theta \cdot r$

$x = r\cos\theta$

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

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

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

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

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

$(2, 0) \quad r = 2$

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

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

Plot

If not on unit circle, estimate!

8. $(2, \frac{5\pi}{6})$ 10. $(-3, \frac{17\pi}{10})$

Convert to rect

16. $(2.5, \frac{17\pi}{4})$ 18. $(-2, -\frac{14\pi}{5})$

Don't freak out here either! Just use your calculator in radian mode. You will get yucky decimals!!!

Find 3 more names

24. $(1, -\frac{\pi}{4})$ 26. $(-2.5, 50^\circ)$

Convert to Polar. (ignore other directions)

28. $(1, 3)$ 30. $(-1, -2)$

Convert polar EQn to rect. EQn

35. $r = 3\sec\theta$ 36 $r = -2\csc\theta$

37. $r = -3\sin\theta$ 38. $r = -4\cos\theta$

39. $r\csc\theta = 1$ 40. $r\sec\theta = 3$

Convert rect EQn to Polar EQn

44. $x = 5$ 45 $2x - 3y = 5$

46. $x^2 + (y-1)^2 = 1$