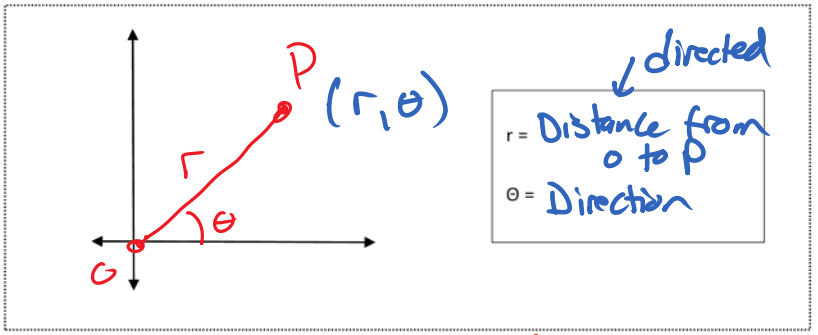
Day 10 Notes

Sunday, March 8, 2015 2:40 PM

Precalculus
6.4 Day 1 - Polar Coordinates

Name:
Period:

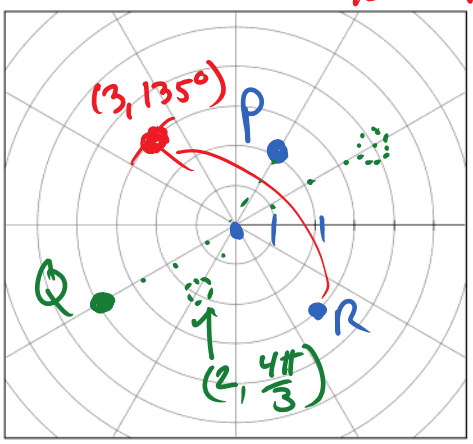


directed

r = Distance from O to P

Θ = Direction

Let's Practice Plotting on the Polar Coordinate Plane!



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

Q: $\left(-4, \frac{\pi}{6}\right)$

R: $(3, -45°)$

Unlike rectangular coordinates (x,y), polor coordinates are *NOT* unique. Can you come up with another polar coordinate to represent the points above?

$(2, \frac{7\pi}{3})$ $(2, -5\pi/3)$ $(-2, \frac{4\pi}{3})$

$(3, 315°)$ $(3, -405°)$ $(-3, 135°)$

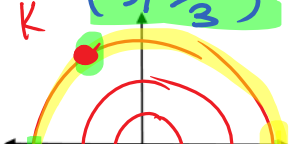
Let P have the polar coordinates (r,Θ). Any other polar coordinate of P must be of the form:

$(r, \theta + 2\pi n)$ or $(-r, \theta + (2n+1)\pi)$

$(r, \theta + 360n)$ $(-r, \theta + (2n+1)180°)$

$\pi \cdot n$

Try it!
Find all polar coordinates for the given point over the specified domain.

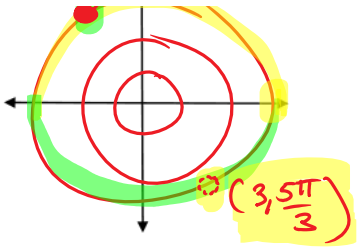


K: $\left(3, \frac{2\pi}{3}\right)$

a. $0 \le \Theta \le 2\pi$ $(3, \frac{2\pi}{3})$

b. $-\pi \le \Theta \le \pi$

$(-3, \frac{5\pi}{3})$ -2π

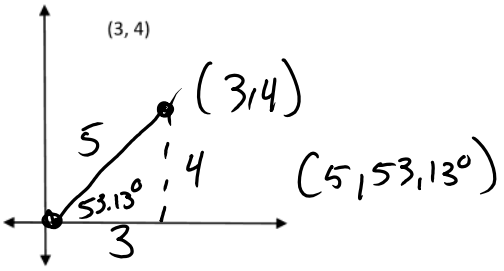


b. $-\pi \le \Theta \le \pi$ $(3, \frac{2\pi}{3})$ $(-3, \frac{-\pi}{3})$

c. $0 \le \Theta \le 4\pi$ $(3, \frac{2\pi}{3})$ $(-3, \frac{5\pi}{3})$ $(3, \frac{8\pi}{3})$ $(-3, \frac{11\pi}{3})$

CONVERTING BETWEEN RECTANGULAR AND POLAR COORDINATES:

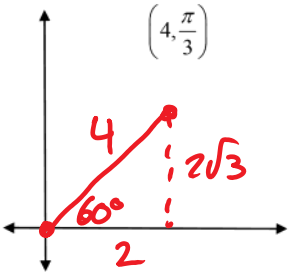
Rectangular → Polar:



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

$\theta = \tan^{-1}\left(\frac{y}{x}\right)$

Polar → Rectangular:



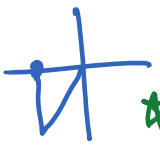
$x = r \cdot \cos\theta$

$y = r \sin\theta$

Practice!

Convert from Rectangular to Polar. *Can you find two polar coordinates?*

1. $(-4, -4)$



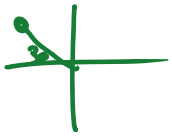
$(4\sqrt{2}, 225°)$ * $(4\sqrt{2}, 585°)$ *

2. $(-2, 6)$

$(2\sqrt{10}, 108.4°)$ * $(2\sqrt{10}, 468.4°)$ *

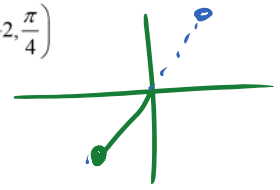
Convert from Polar to Rectangular.

3. $\left(3, \frac{5\pi}{6}\right)$



$(-\frac{3\sqrt{3}}{2}, \frac{3}{2})$

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



$(-\sqrt{2}, -\sqrt{2})$