

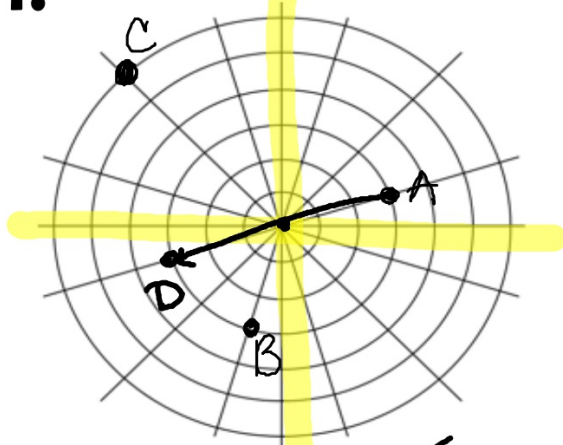
QUIZ on Conics

* STUDY
&
PREPARE

Warm Up

1. Write the following coordinates as shown.

NCSCOS: 2.05
Precalc obj: 8.1



D. $(-3, 30^\circ)$
or
 $(3, 210^\circ)$

A:
B:
C:

$(30^\circ, 3)$ or $(3, 30^\circ)$ or $(3, \pi/6)$

$(3, 240^\circ)$

$(6, 135^\circ)$

2. Think & Write: What does a negative radius mean when you plot a point on a polar coordinate?

Objective 8.2 - Converting Polar & Rectangular Coordinates

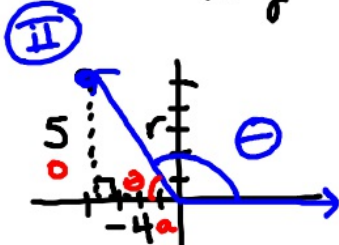
Why? There are a large amount of questions on your NCFE based on this section of Unit 8, and you are capable of mastering all of them. However, more importantly, as mathematicians and future mathematicians, you need to be able to bridge the gap between Cartesian (x, y) and Polar (r, θ) planes. Polar planes are used in sonar devices, imaging, globes, ground-water flow equations, and navigation systems. Polar coordinate systems date back to Ancient Greece where Hipparchus first created a table of chord functions to establish stellar positions.

Copy-Me-Teach

Part I: Converting from Rectangular to Polar

1. $(-4, 5) \rightarrow (\sqrt{41}, 129^\circ)$

$x \quad y \quad \quad \quad r \quad \theta$



$\theta:$
 $\tan^{-1}\left(\frac{5}{4}\right) = \theta$
 $51^\circ = \theta$

Radius:

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

$$r^2 = (-4)^2 + (5)^2$$

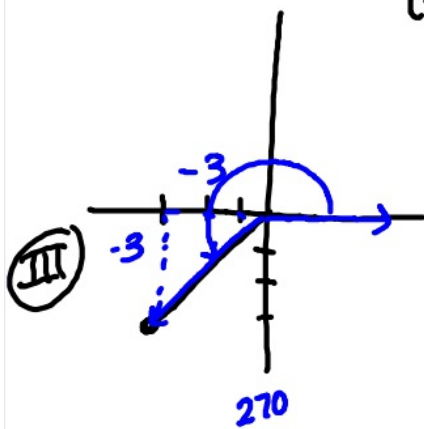
$$r^2 = 41$$

$$r = \sqrt{41}$$

$180 - 51 = 129^\circ$

$(3\sqrt{2}, 225^\circ)$

3. $(-3, -3)$



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

$$(-3)^2 + (-3)^2 = r^2$$

$$9 + 9 = r^2$$

$$18 = r^2$$

$$\sqrt{18} = r$$

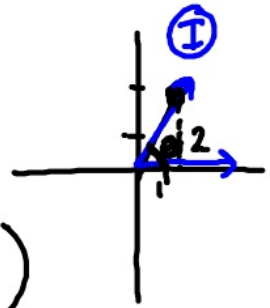
$$2 \cdot 9 = 18$$

$$3 \cdot 3 = 9$$

$$3\sqrt{2} = r$$

θ
 $\tan^{-1}\left(\frac{3}{3}\right)$
 45°
 $(270 - 45)$
 225°

2. $(1, 2)$



$(\sqrt{5}, 63^\circ)$

Radius:

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

$$r^2 = 1^2 + 2^2$$

$$r^2 = 5$$

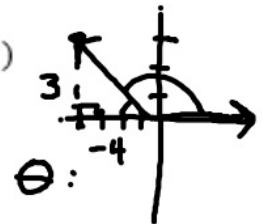
$$r = \sqrt{5}$$

$\theta:$

$$\tan^{-1}\left(\frac{2}{1}\right)$$

63°

4. $(-4, 3)$



radius:

$r = 5$

$\theta = \tan^{-1}\left(\frac{3}{4}\right)$

$\theta = 37^\circ$

$(143^\circ, 5)$

$180 - 37$
 143°

Stop and Jot

On the post it, write 1-2 sentences summarizing the way you convert from rectangular to polar.

Converting from Polar to Rectangular

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

$$x = r \cos \theta$$

$$y = r \sin \theta$$

- * Radian
(3, $\frac{\pi}{2}$)
- * Degree
(3, 90°)

Part 2: Converting from Polar to Rectangular

5. $(1, 45^\circ)$ * degree $(.71, .71)$

$$x = 1 \cdot \cos(45) = \frac{\sqrt{2}}{2} = .71$$

$$y = 1 \cdot \sin(45) = \frac{\sqrt{2}}{2} = .71$$



6. $(3, 60^\circ)$

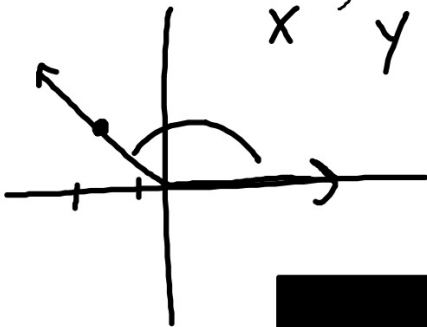
$$x = 3 \cos(60) = 1.5$$

$$y = 3 \sin(60) = 2.6$$

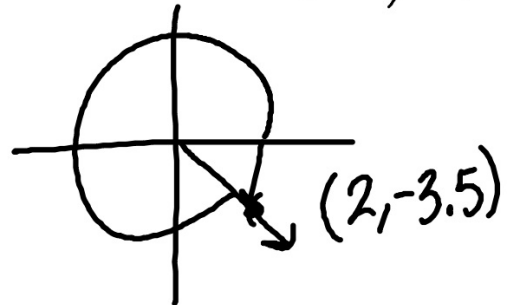
$$(1.5, 2.6)$$



7. $(2, 150^\circ)$ $(-1.7, 1)$
x y



8. $(4, 300^\circ)$ $(2, -3.5)$



Stop and Jot

On the post it, write 1-2 sentences summarizing the way you convert from polar to rectangular.

Turn to a Neighbor and...

PRECALCULUS — RELEASED FORM



- 1 What are the *approximate* rectangular coordinates for the point with polar coordinates $(5, 30^\circ)$?

A (2.5, 2.89)

~~B (2.5, 4.33)~~

C (2.89, 4.33)

D (4.33, 2.5)

$$x = 5 \cos 30 = 4.33$$

$$y = 5 \sin 30 = 2.5$$

$$(4.33, 2.5)$$

Relay Race!

- 2 teams!
- Convert from polar to rectangular
- Check each answer by finding the right point and placing it on the poster in the correct location

Exit Journal

Pretend you are a Naval Captain mapping points of enemy ships.

Write a letter to your favorite teacher about polar coordinates and how you are using them during your time of maritime war. Feel free to really get into character and get creative.

