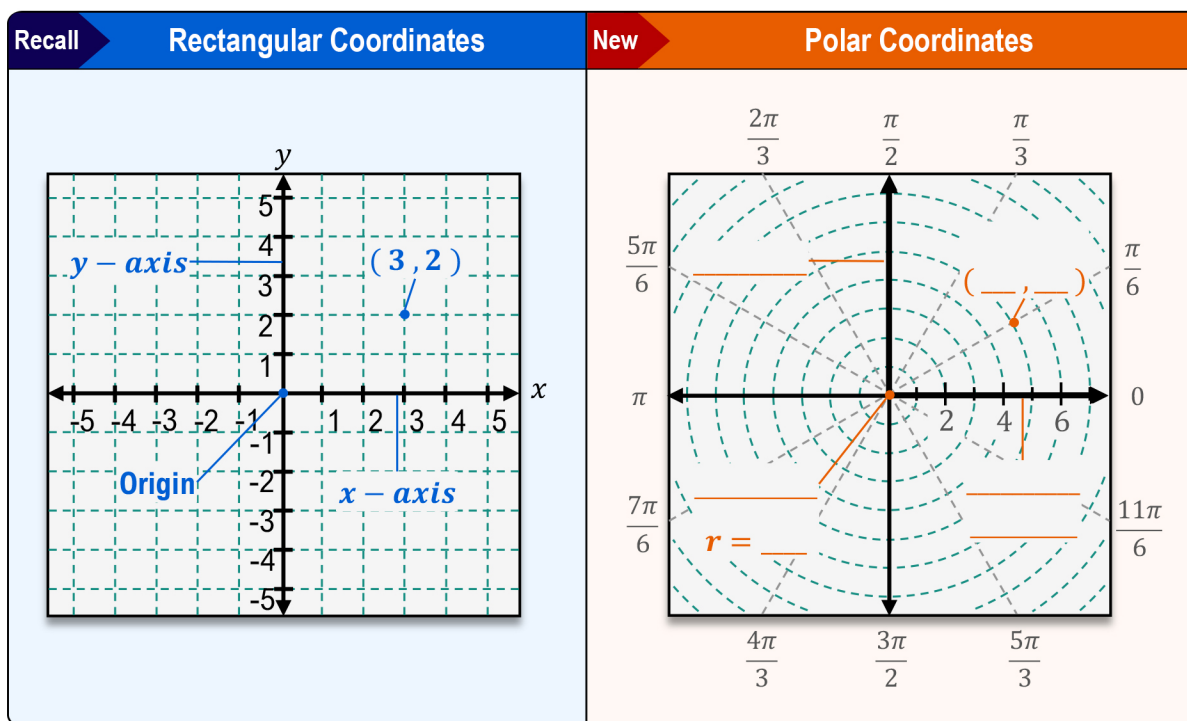


TOPIC: POLAR COORDINATE SYSTEM

Intro to Polar Coordinates

◆ Like the rectangular system, you'll use the **polar coordinate system** to plot points in terms of r & θ .

- r is the distance from the **pole** (*origin*), and θ is the $\angle$ from the **polar axis** (+ x -axis).



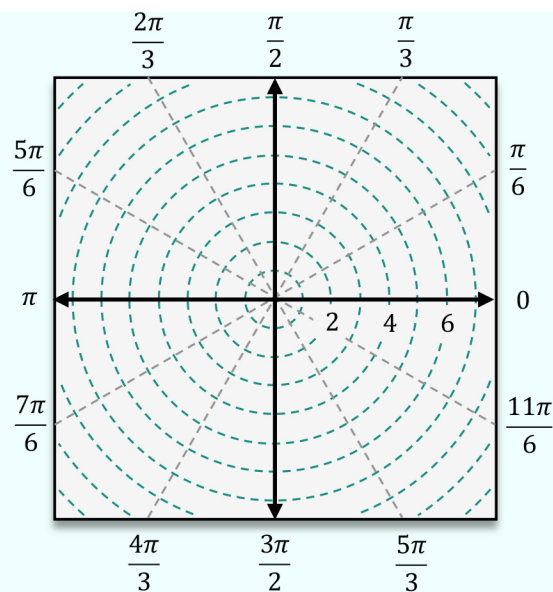
◆ To plot points in polar coordinates, locate _____ *first*, then count _____ units away from pole.

EXAMPLE Plot the points on the polar coordinate system.

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

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

(C) $\left(-3, \frac{\pi}{6}\right)$



◆ If $\theta < 0$, measure angle [CW | CCW]. This is a reflection over the [POLE | POLAR AXIS].

◆ If $r < 0$, count from pole in _____ direction. This is a reflection over the [POLE | POLAR AXIS].

TOPIC: POLAR COORDINATE SYSTEM

EXAMPLE

Plot the points on the polar coordinate system.

(A)

$$(5, 60^\circ)$$

(B)

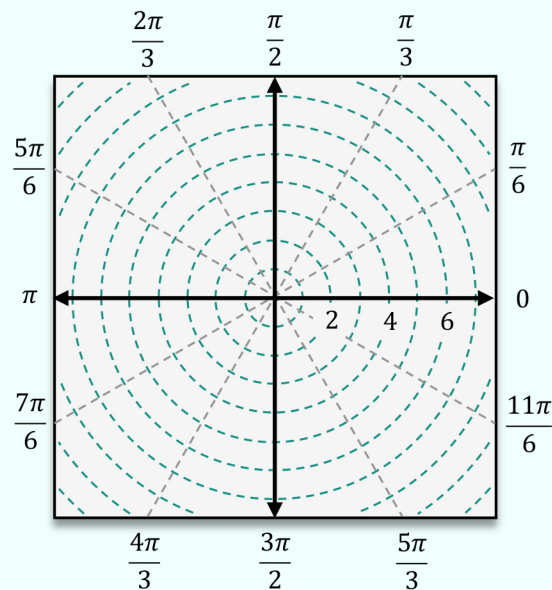
$$(3, 90^\circ)$$

(C)

$$\left(0, -\frac{5\pi}{3}\right)$$

(D)

$$\left(2, \frac{7\pi}{3}\right)$$



PRACTICE

Plot the points on the polar coordinate system.

(A)

$$(5, 210^\circ)$$

(B)

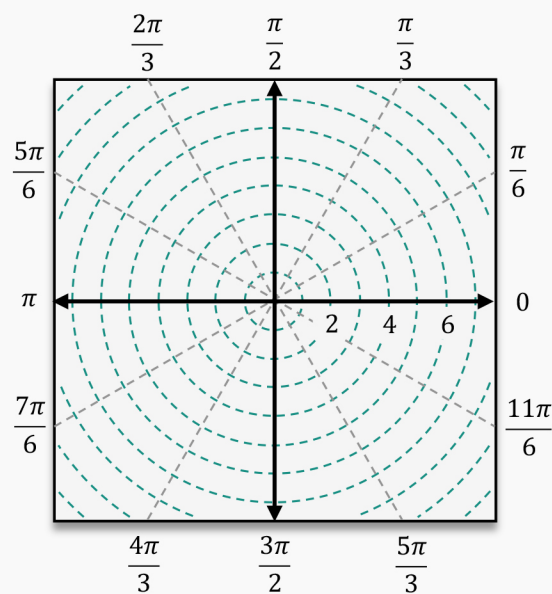
$$(-3, -90^\circ)$$

(C)

$$\left(6, -\frac{11\pi}{6}\right)$$

(D)

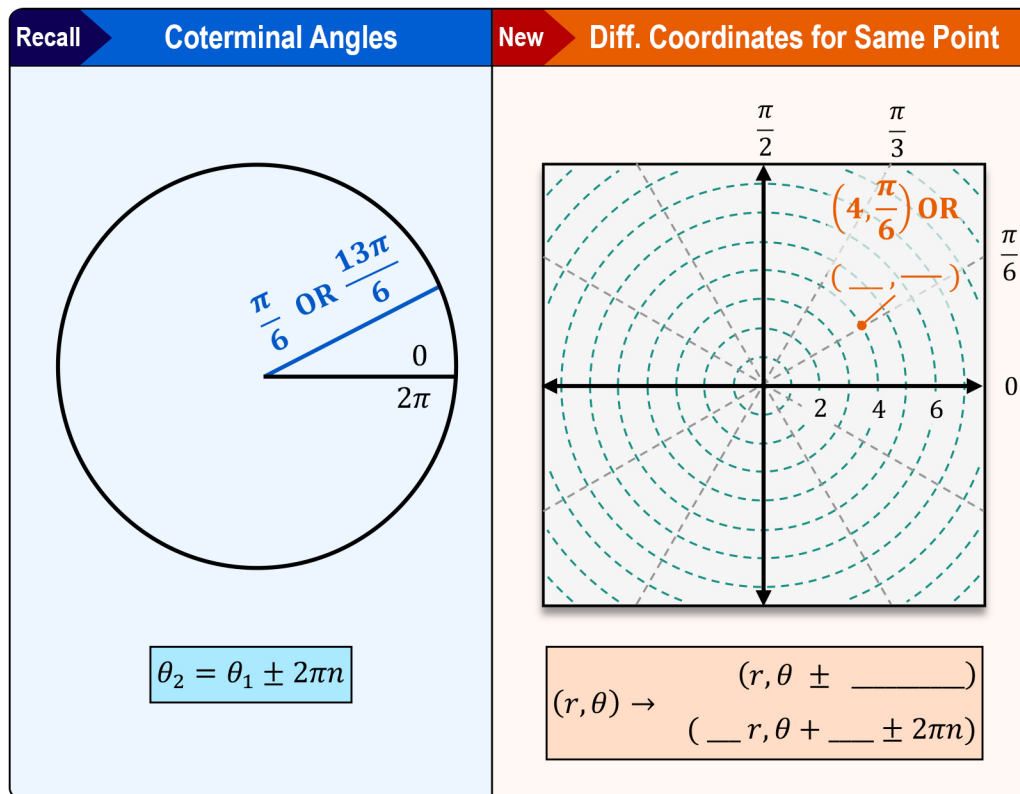
$$\left(-2, \frac{2\pi}{3}\right)$$



TOPIC: POLAR COORDINATE SYSTEM

Determining Different Coordinates for the Same Point

◆ In polar coordinates, *one* point can be represented by *multiple* ordered pairs.



EXAMPLE

For the point $(4, \frac{\pi}{6})$, find another set of coordinates, (r, θ) , where:

(A) $r \geq 0, \quad -2\pi \leq \theta \leq 0$

(B) $r \leq 0, \quad 0 \leq \theta \leq 2\pi$

TOPIC: POLAR COORDINATE SYSTEM

PRACTICE

Plot the point $\left(3, \frac{\pi}{2}\right)$ & find another set of coordinates, (r, θ) , for this point, where:

(A)

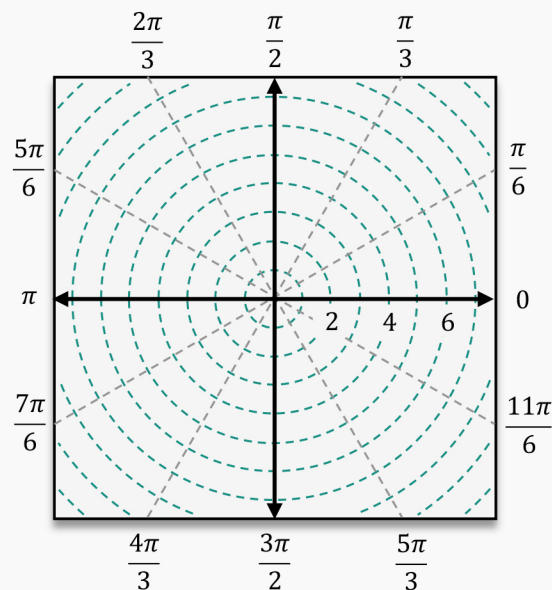
$$r \geq 0, \quad 2\pi \leq \theta \leq 4\pi$$

(B)

$$r \geq 0, \quad -2\pi \leq \theta \leq 0$$

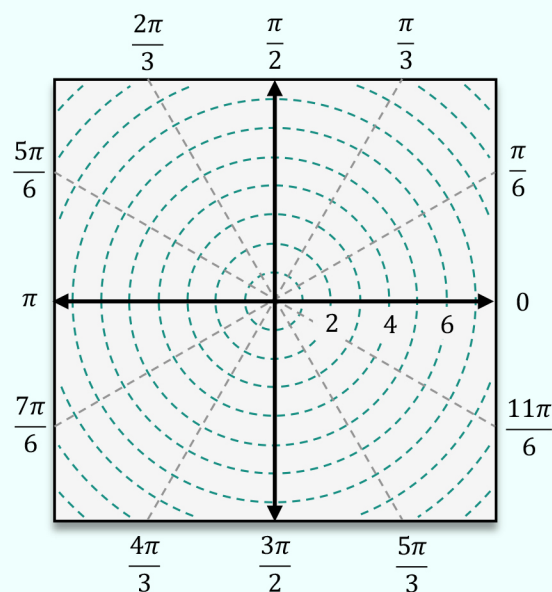
(C)

$$r \leq 0, \quad 0 \leq \theta \leq 2\pi$$



EXAMPLE

Plot the point $\left(-2, \frac{5\pi}{3}\right)$ & find 3 sets of coordinates, (r, θ) , for this point.



TOPIC: POLAR COORDINATE SYSTEM

PRACTICE

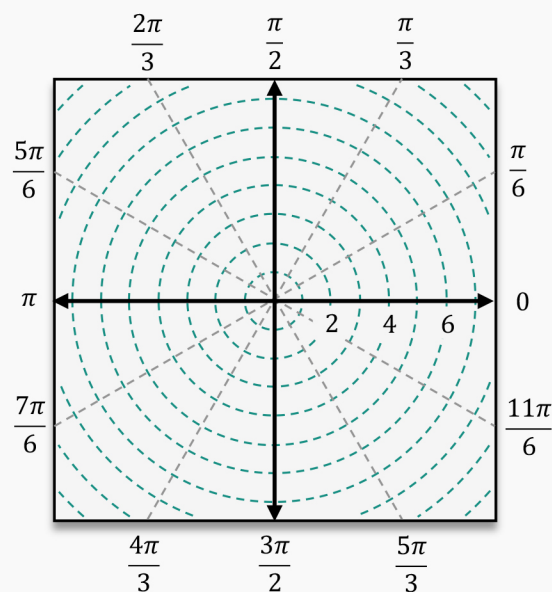
Plot the point $\left(5, -\frac{\pi}{3}\right)$, then identify which of the following sets of coordinates is the same point.

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

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

$\left(-5, \frac{2\pi}{3}\right)$

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



PRACTICE

Plot the point $\left(-3, -\frac{\pi}{6}\right)$, then identify which of the following sets of coordinates is the same point.

$\left(-3, \frac{11\pi}{6}\right)$

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

$\left(3, \frac{11\pi}{6}\right)$

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

