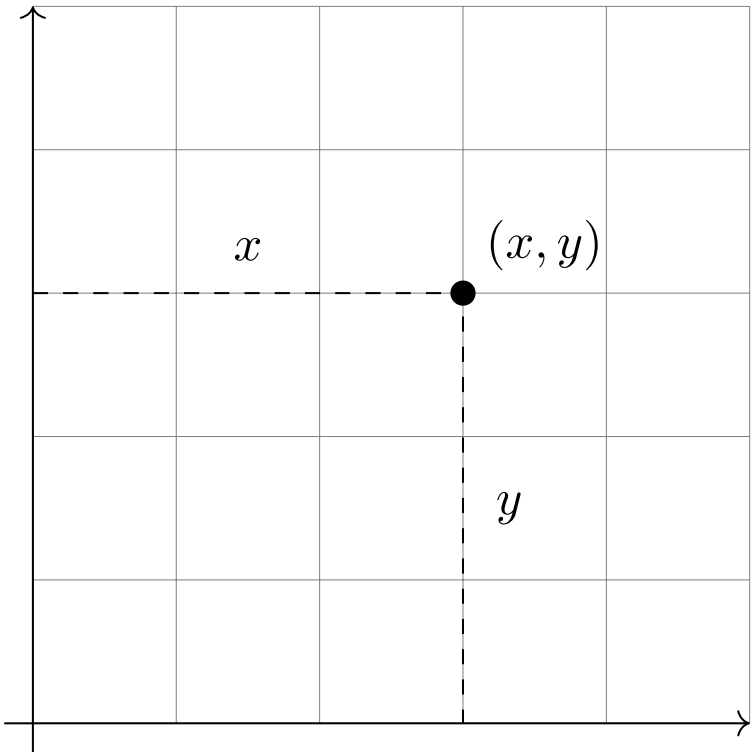
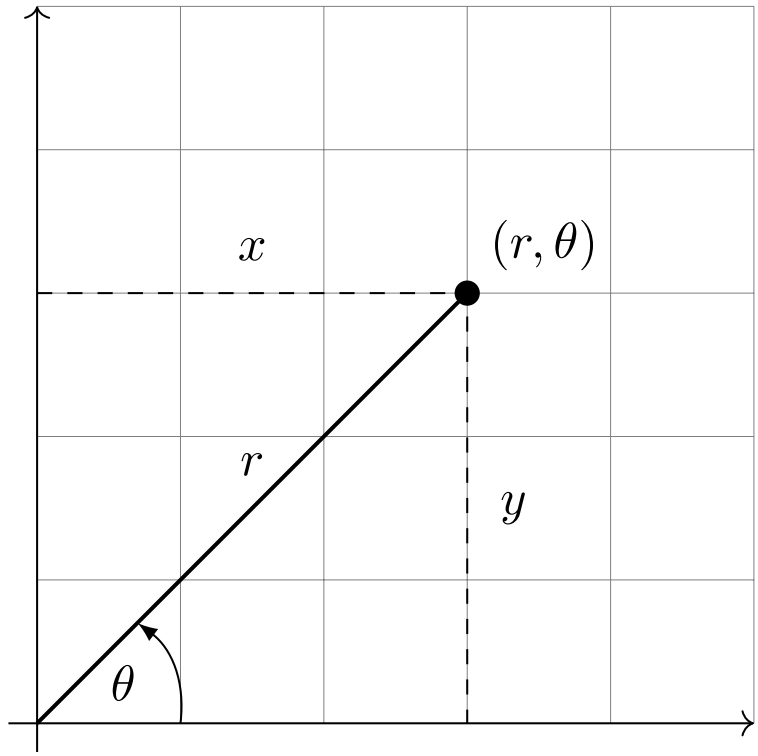
POLAR CURVES

SEMESTER 2019/2

Polar Coordinates

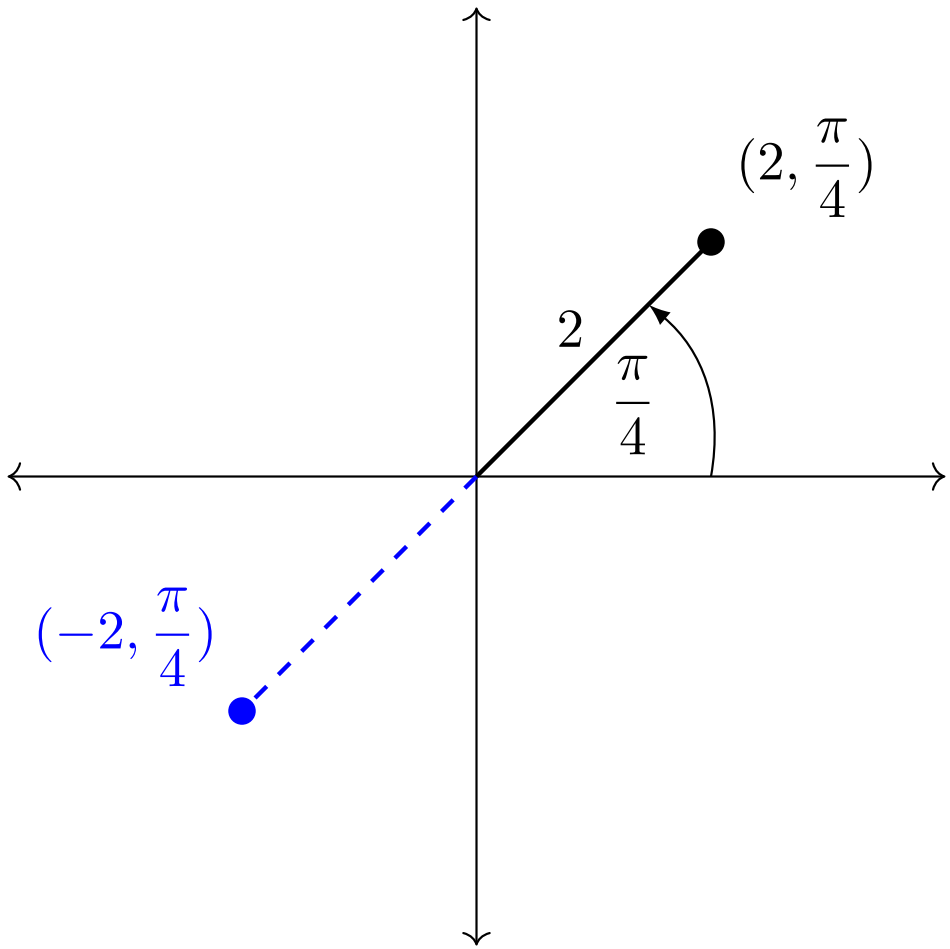


Cartesian Coordinate System



Polar Coordinate System

Example 1 Consider the following points in the polar coordinate system.



Example 2 Plot the point $(1, 0°)$, $(1, 45°)$, $(1, 90°)$, $(1, 120°)$ and $(1, 300°)$ in the polar coordinate system.

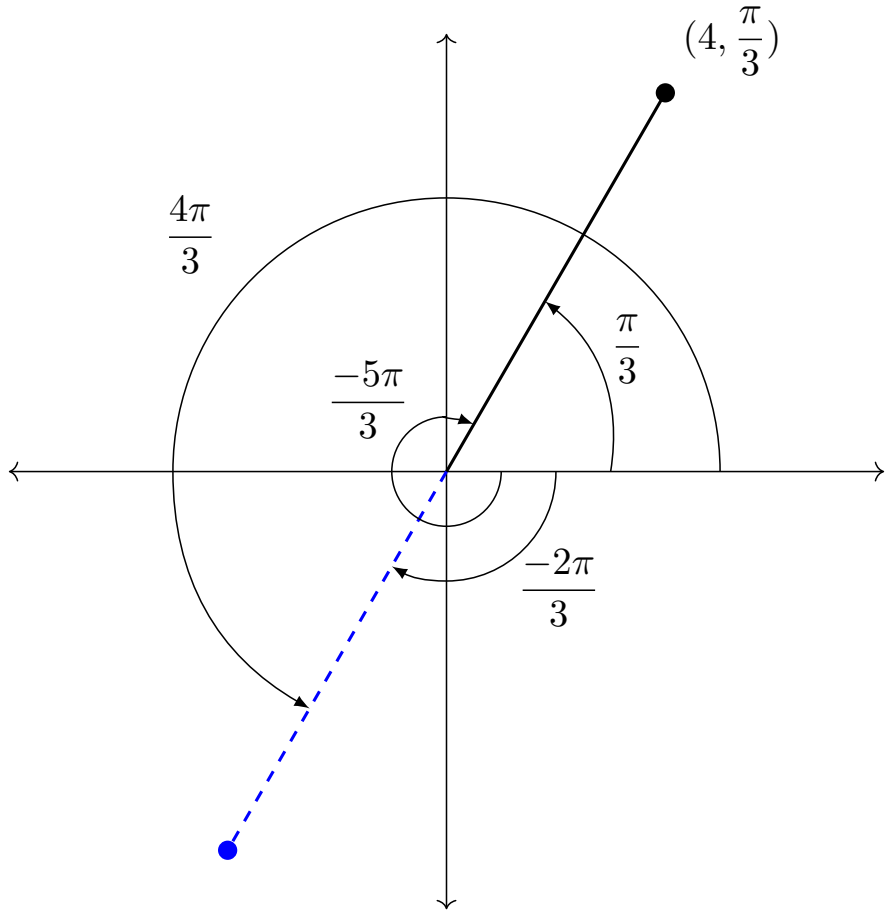
Example 3 Plot the point $(1, 0°)$, $(1, -45°)$, $(1, -90°)$, $(1, -120°)$ and $(1, -300°)$ in the polar coordinate system.

Example 4 Plot the point $(1, 0)$, $(1, \frac{\pi}{2})$, $(1, \pi)$, $(1, \frac{3\pi}{2})$ and $(1, 2\pi)$ in the polar coordinate system.

Example 5 Plot the point $(3, \frac{\pi}{3})$ and $(6, \frac{5\pi}{6})$ in the polar coordinate system.

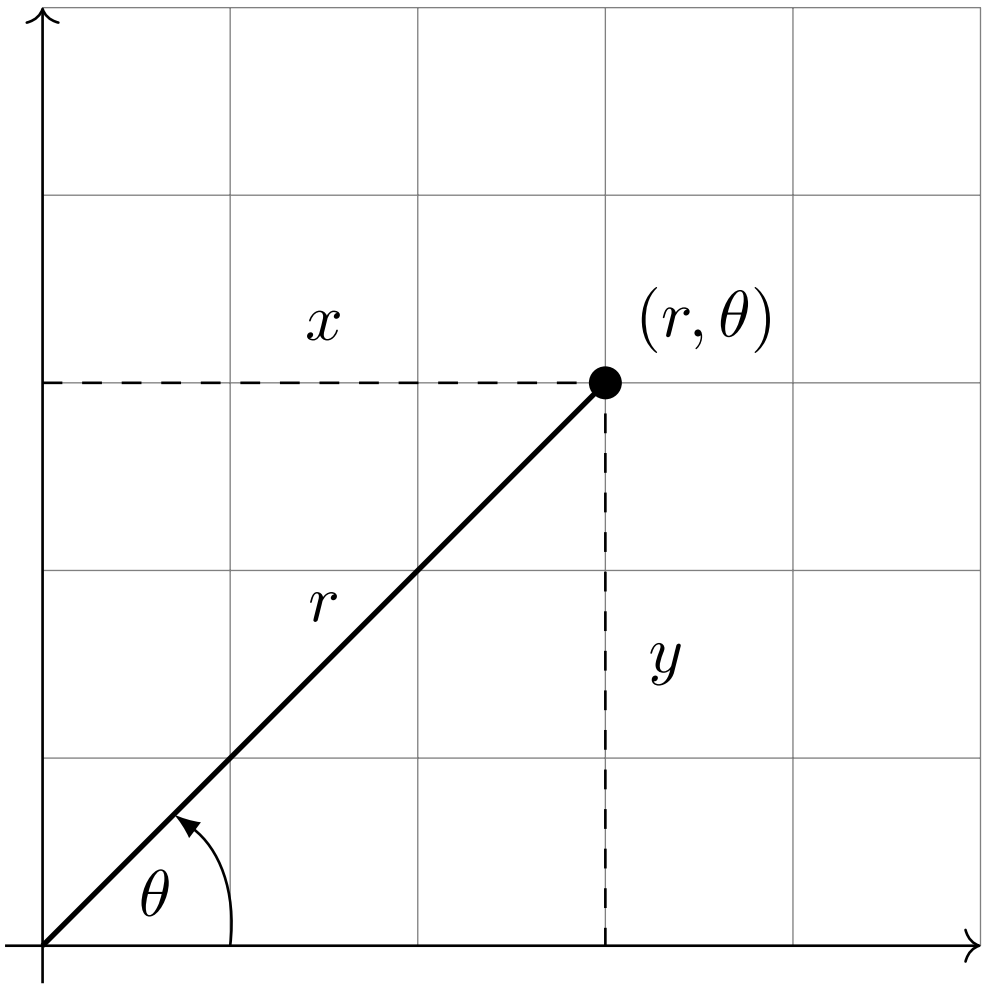
Example 6 Plot the point $(-3, \frac{\pi}{3})$ and $(6, -\frac{5\pi}{6})$ in the polar coordinate system.

Example 7 Consider the following points in the polar coordinate system.



$$\left(4, \frac{\pi}{3}\right) = \left(4, -\frac{5\pi}{3}\right) = \left(-4, \frac{4\pi}{3}\right) = \left(-4, -\frac{2\pi}{3}\right)$$

Polar/Cartesian Conversion Formulas



$$x = r\cos(\theta)$$

$$y = r\sin(\theta)$$

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

Example 8 Convert the point $(5, 30^\circ)$ in the polar coordinate system to a point in the Cartesian coordinate system.

Example 9 Convert the point $(-3, 60^\circ)$ in the polar coordinate system to a point in the Cartesian coordinate system.

Example 10 Convert the point $(2, -\frac{\pi}{4})$ in the polar coordinate system to a point in the Cartesian coordinate system.

Example 11 Convert the point $(-3, 3)$ in the Cartesian coordinate system to a point in the polar coordinate system.

Example 12 Convert the point $(5\sqrt{3}, 5)$ in the Cartesian coordinate system to a point in the polar coordinate system.

Example 13 Convert the point $(\frac{3}{2\sqrt{3}}, -\frac{3}{2})$ in the Cartesian coordinate system to a point in the polar coordinate system.

Example 14 Convert the point $(-5, 0)$ in the Cartesian coordinate system to a point in the polar coordinate system.

Example 15 Convert the point $(-5, 0)$ in the Cartesian coordinate system to a point in the polar coordinate system.

Example 16 Convert the Cartesian equation

$$x - 2y = -3$$

into polar coordinates.

Example 17 Convert the Cartesian equation

$$x = y^2 + 3$$

into polar coordinates.

Example 18 Convert the Cartesian equation

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

into polar coordinates.