

# Polar Coordinates (Appendix H1)

Thanks to Faan Tone Liu

## Key Points:

- Every location in the plane can be described by  $(r, \theta)$ , where

$r$  = distance from the origin

$\theta$  = angle from the positive  $x$ -axis.

- Consider the following picture:

- Converting from polar to rectangular coordinates:

$$x =$$

$$y =$$

- Converting from rectangular to polar coordinates:

$$r^2 =$$

$$\tan \theta =$$

## Examples:

1. Plot the following points:

A.  $(r, \theta) = (2, \frac{2\pi}{3})$

B.  $(r, \theta) = (4, \frac{3\pi}{2})$

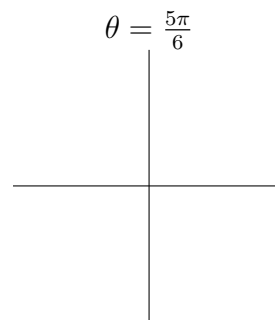
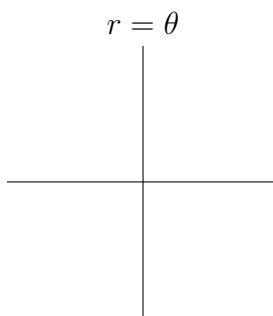
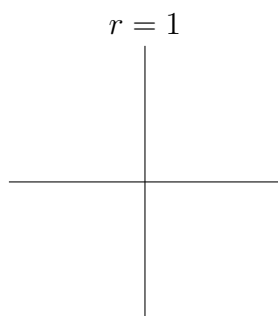
C.  $(r, \theta) = (-3, \frac{3\pi}{4})$

D.  $(r, \theta) = (0, \frac{11\pi}{6})$

2. Convert  $(2, \frac{2\pi}{3})$  into rectangular coordinates.

3. Convert  $(-5, -5\sqrt{3})$  into polar coords.
4. Convert  $r = 2$  to rectangular coords.
5. Convert  $r = 3 \cos \theta$  to rectangular coords.

6. Graph the following polar curves:



7. Graph the following polar curves (Hint: first graph in rect. coords):

