Polar Coordinates

Alternate coordinate system that is based on a point called the **pole** and a ray called the **polar axis.**



The pole and polar axis can be superimposed over the rectangular coordinate system (x,y) where the pole is centered at the origin (0,0) and the polar axis is over the positive x-axis.



However, a coordinate described in polar form is a point $P(r,\theta)$ where we can plot P by rotating the polar axis by an angle θ and a distance |r| from our pole. Of course, $\theta > 0$ means our rotation is counter clockwise (ccw) and when $\theta < 0$ means our rotation is clockwise (ccw).

Consider the following examples. We will plot the following polar coordinates using the pole and polar axis which is known as polar form.





2. $\left(2,\frac{\pi}{6}\right)$





4. $\left(5,\frac{\pi}{4}\right)$



5. (3*,*π)

















Of course, our radius can be negative as well, r < 0. We can use the following relationship to plot polar coordinates with negative radii.



















