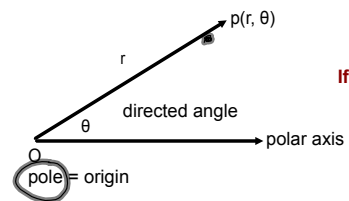


9-6 Polar Coordinates Day 1

Polar Coordinate System

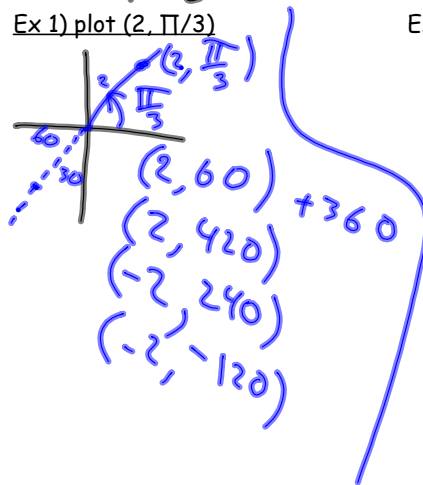


r = directed line segment

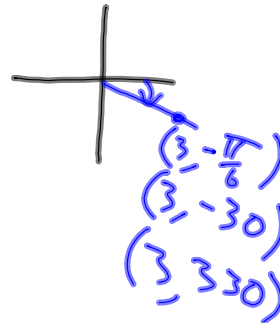
r is the directed distance from the origin to a point.

If r is negative, then you are 180° from the given angle measure.

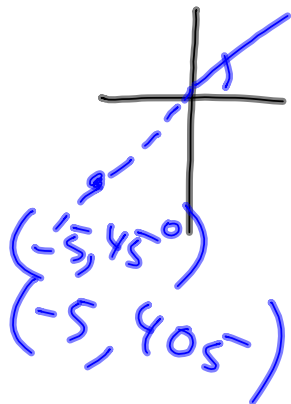
Ex 1) plot $(2, \pi/3)$



Ex 2) plot $(3, -\pi/6)$



Ex 3) plot $(-5, 45^\circ)$



Coordinate Conversion

(r, θ) to (x, y)

$$x = r \cos \theta$$

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

$$y = r \sin \theta$$

$$\tan \theta = y/x$$

Polar to rectangular.

Ex 4) $(4, \pi/2)$



$$x = r \cos \theta$$

$$x = 4 \cos \frac{\pi}{2}$$

$$x = 4(0)$$

$$x = 0$$

$$(0, 4)$$

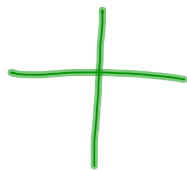
$$y = r \sin \theta$$

$$y = 4 \sin \frac{\pi}{2}$$

$$y = 4(1)$$

$$y = 4$$

Ex 5) $(-1, -\pi/3)$



$$x = r \cos \theta$$

$$x = -1 \cos \frac{\pi}{3}$$

$$x = (-1)(\frac{1}{2})$$

$$x = -\frac{1}{2}$$

$$y = r \sin \theta$$

$$y = -1 \sin \frac{\pi}{3}$$

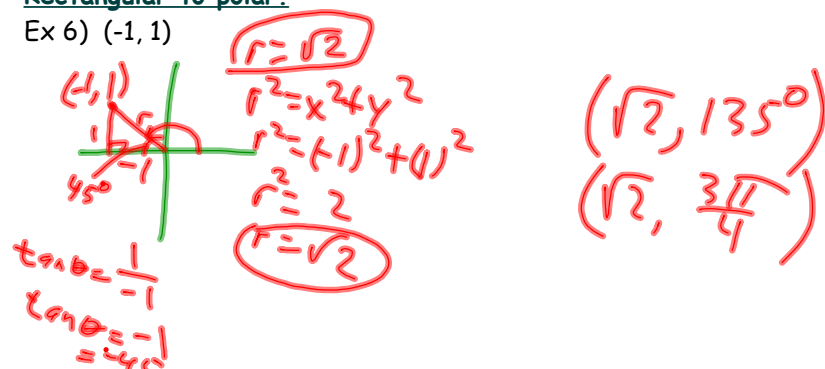
$$y = (-1)(-\frac{\sqrt{3}}{2})$$

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

$$(-\frac{1}{2}, \frac{\sqrt{3}}{2})$$

Rectangular to polar.

Ex 6) $(-1, 1)$



Ex 7) $(0, 2)$

