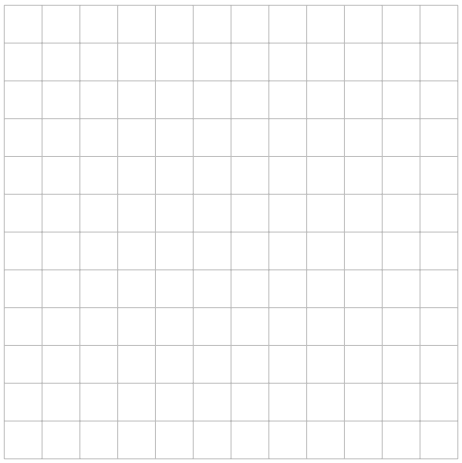
POLAR TIME

The polar point (r, θ) is the point at a distance r from the origin in the direction of angle θ. To convert from polar to Cartesian:

$$x = r\cos\theta$$
$$y = r\sin\theta$$

1. Plot the polar points and find their Cartesian coordinates:



a) $\left(2, \dfrac{2\pi}{3}\right)$

b) $\left(1, -\dfrac{\pi}{4}\right)$

c) $\left(-1, \dfrac{3\pi}{4}\right)$

When converting from Cartesian to polar coordinates:

$$r^2 = x^2 + y^2$$
$$\tan\theta = \frac{y}{x}$$

Some values of $\tan\theta$:

θ	0	$\frac{\pi}{6}$	$\frac{\pi}{4}$	$\frac{\pi}{3}$	$\frac{\pi}{2}$
$\tan\theta$	0	$\frac{1}{\sqrt{3}}$	1	$\sqrt{3}$	U

2. Find the polar coordinates of the Cartesian points:

a) $(\sqrt{3}, 1)$
b) $(-1, 1)$
c) $(2, -\sqrt{12})$

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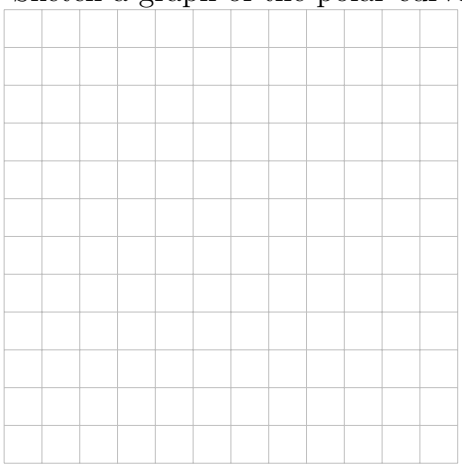
3. Sketch a graph of the polar curve: $r = 1 + 2\cos\theta$. Give coordinates for all axis intercepts.



4. Sketch graphs of the polar curves. $r = \sin\theta$. Label all axis intercepts.

a) $r = \sin\theta$.
b) $r = \sin(2\theta)$.
c) $r = \sin(3\theta)$.