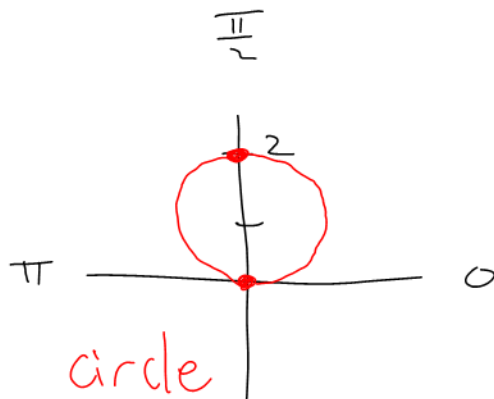


10.4 Cont'd

Ex: Sketch $r = 2\sin\theta$

Note: Curve is sketched out over $0 \leq \theta < \pi$

θ	$r = 2\sin\theta$
0	0
$\frac{\pi}{2}$	2
π	0

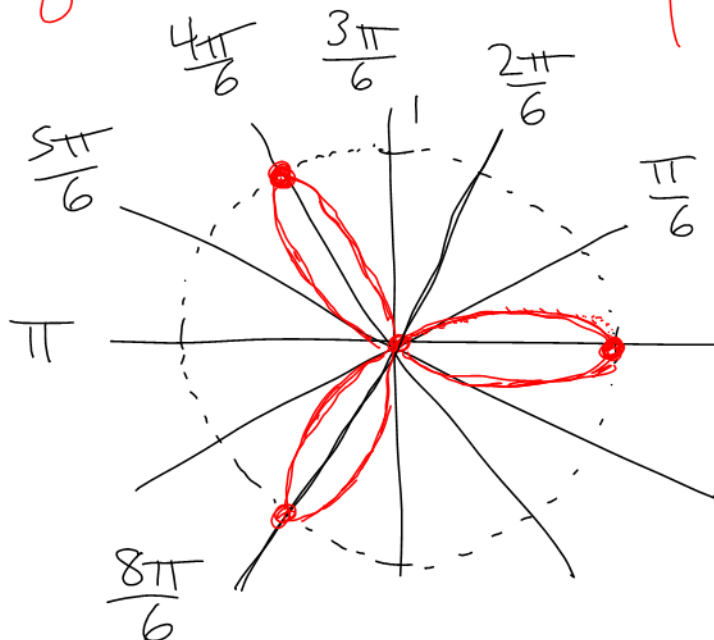


Ex: Sketch $r = \cos 3\theta$

Note: Curve is traced out over $0 \leq \theta < \pi$

θ	$r = \cos 3\theta$
0	1
$\frac{\pi}{6}$	0
$\frac{2\pi}{6}$	-1
$\frac{3\pi}{6}$	0

θ	$r = \cos 3\theta$
$\frac{4\pi}{6}$	1
$\frac{5\pi}{6}$	0
π	-1



rose
with
3 petals

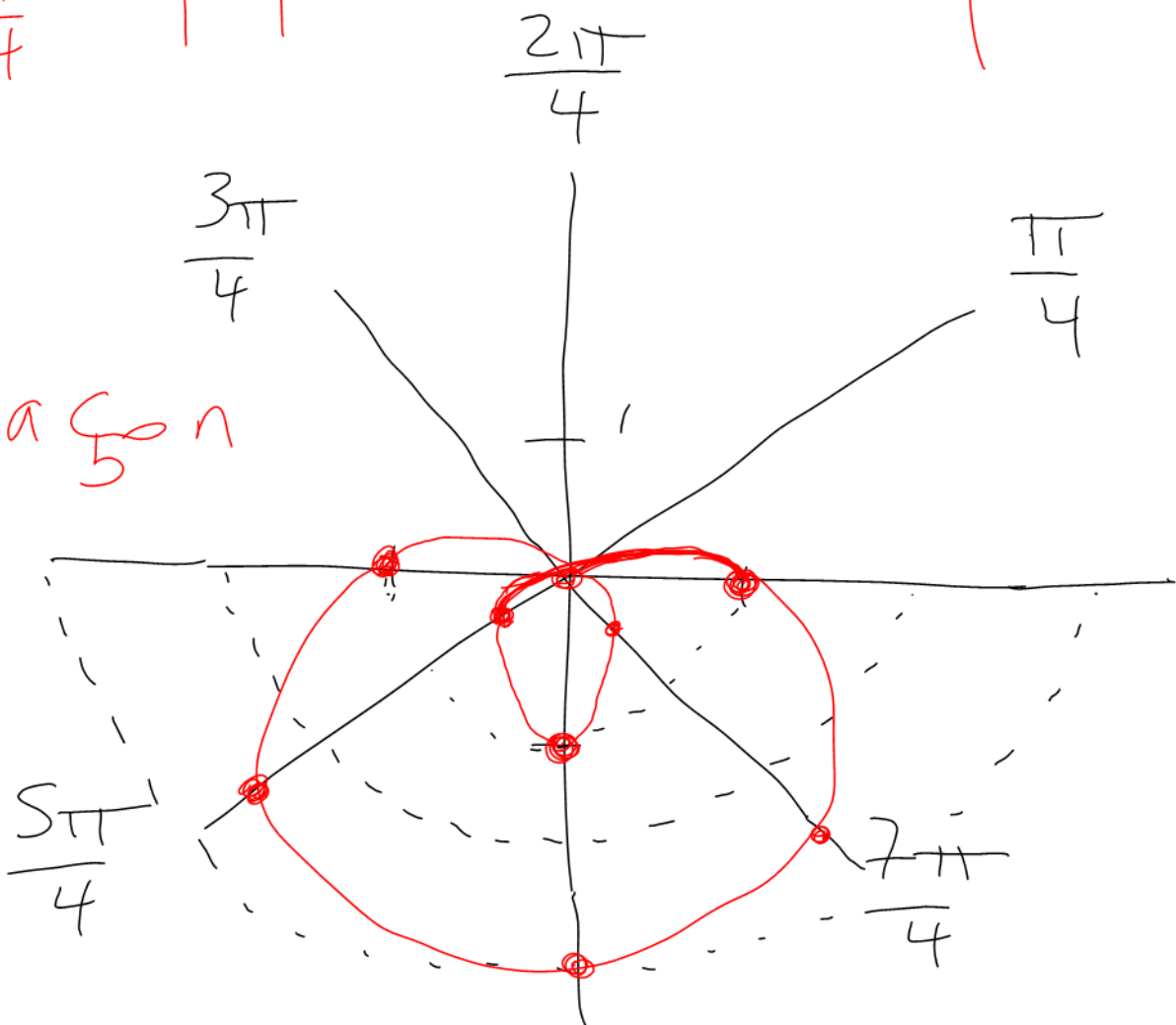
Ex: Sketch $r = 1 - 2\sin\theta$

Note: Sketch in increments of $\frac{\pi}{4}$

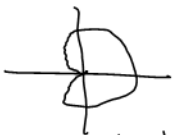
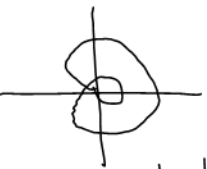

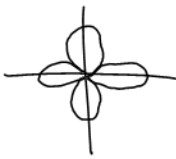
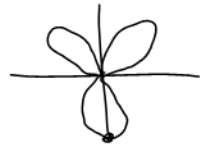

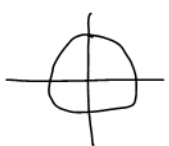
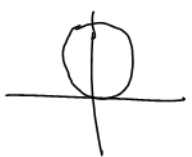
θ	$r = 1 - 2\sin\theta$
0	1
$\frac{\pi}{4}$	-0.4
$\frac{2\pi}{4}$	-1
$\frac{3\pi}{4}$	-0.4
$\frac{4\pi}{4}$	1

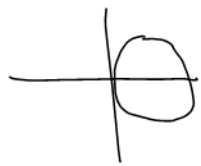
θ	$r = 1 - 2\sin\theta$
$\frac{5\pi}{4}$	2.4
$\frac{6\pi}{4}$	3
$\frac{7\pi}{4}$	2.4
$\frac{8\pi}{4}$	1

limaçon



Let a and b be real numbers.

<u>Name</u>	<u>Graph</u>	<u>Equation</u>	<u>Traced Out Over</u>
Limaçon		$r = a + b \sin \theta$ or $r = a + b \cos \theta$	$[0, 2\pi)$
	 or rotated	Inner loop if $ a < b $	
Rose		$r = \sin 2\theta$	$[0, 2\pi)$
		$r = \cos 2\theta$	$[0, 2\pi)$
		$r = \sin 3\theta$	$[0, \pi)$
		$r = \cos 3\theta$	$[0, \pi)$
Circle		$r = 1$	$[0, 2\pi)$
		$r = \sin \theta$	$[0, \pi)$

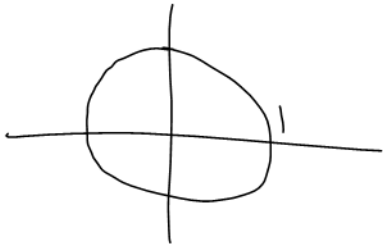


$$r = \cos \theta$$

$$[0, \pi)$$

Review: Solving Trig Equations

Method 1: Unit Circle



$\cos \theta$ is the x-coordinate of a point on unit circle
 $\sin \theta$ " y-coordinate "

$$\sin \theta = 0 \Rightarrow \theta = 0, \pi$$

$$\cos \theta = -1 \Rightarrow \theta = \pi$$

Use this method when solving $\sin \theta = 0, \pm 1$
 $\cos \theta = 0, \pm 1$

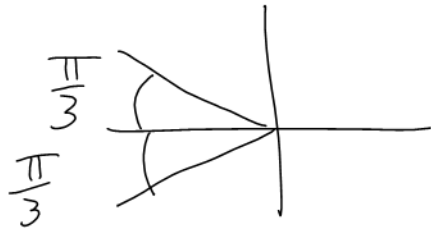
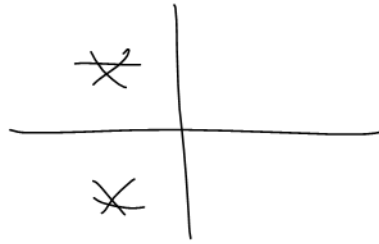
Method 2: Reference Angle

Solve $\cos \theta = -\frac{1}{2}$ on $[0, 2\pi)$

$\cos^{-1} \frac{1}{2} = \frac{\pi}{3}$ is the reference angle

The reference angle is always between 0 and $\frac{\pi}{2}$.
The reference angle is measured to the x-axis.

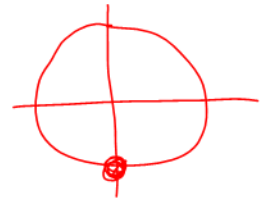
S	A
T	C



$$\theta = \frac{2\pi}{3}, \frac{4\pi}{3}$$

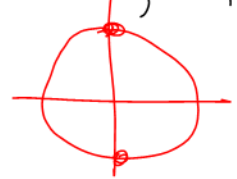
Ex: Solve $\sin \theta = -1$ on $[0, 2\pi)$

$$\theta = \frac{3\pi}{2}$$



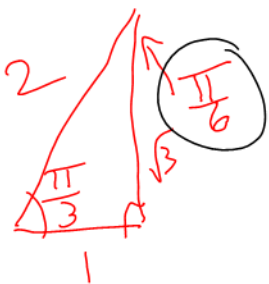
Solve $\cos \theta = 0$ on $[0, 2\pi)$

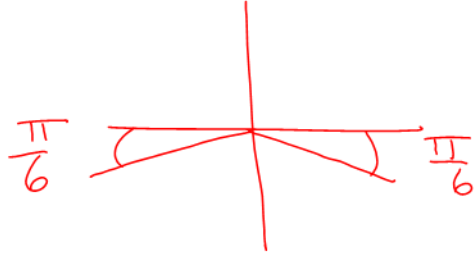
$$\theta = \frac{\pi}{2}, \frac{3\pi}{2}$$



Ex: Solve $\sin \theta = -\frac{1}{2}$ on $[0, 2\pi)$

Reference angle = $\sin^{-1} \frac{1}{2} = \frac{\pi}{6}$





$$\theta = \left(\frac{7\pi}{6}, -\frac{\pi}{6} \right) \quad \checkmark$$

$$\text{or } \theta = \left(\frac{7\pi}{6}, \frac{11\pi}{6} \right) \quad \checkmark$$