Trig 9.2

Graph polar equations
Solve systems of polar equations
Use technology to graph polar equations
Use technology to solve polar systems

system of equations

limacon

lemniscate

rose

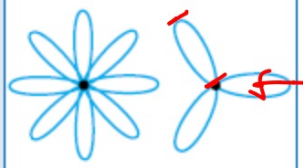
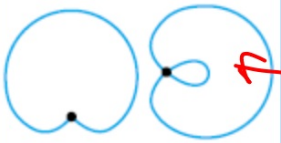
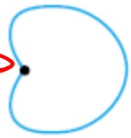
cardioid

spiral of Archimedes (radians)

Gallery walk: polar equations

1 + cos θ
1 − cos θ

p. 564

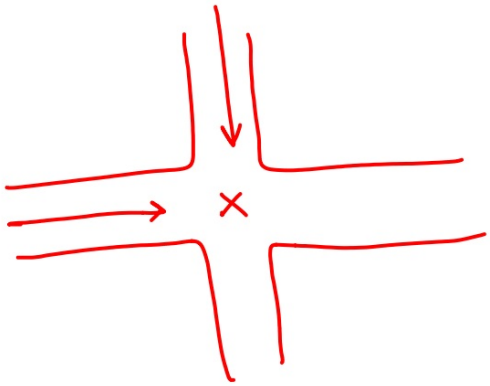
Classical Curves					
Curve	rose (n (no. of petals))	lemniscate *(pronounced lehm NIHS kuht)*	limaçon *(pronounced lee muh SOHN)*	cardioid *(pronounced KARD ee oyd)*	spiral of Archimedes *(pronounced ar kih MEED eez)*
Polar Equation	$r = a\cos n\theta$ $r = a\sin n\theta$ *n is a positive integer.*	$r^2 = a^2\cos 2\theta$ $r^2 = a^2\sin 2\theta$	$r = a + b\cos\theta$ $r = a + b\sin\theta$	$r = a + a\cos\theta$ $r = a + a\sin\theta$	$r = a\theta$ (θ in radians)
General Graph					

Identify the type of curve each represents.

6. $r = 2 - 3 \sin \theta$

7. $r = \cos 2\theta$

One car is traveling east.
One car is traveling south.
When is there an accident?



Graph each system of polar equations. Solve the system using algebra and trigonometry. Assume $0 \le \theta < 2\pi$.

Step is 0.1 rad.

x : 0-7

y : 0-4

Substitution
Elimination
Compare w graphs (intersect @ same time)
degrees or radians?

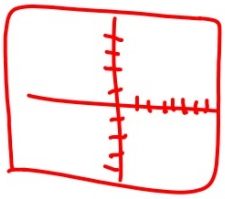
26. $r = 1 + \cos\theta$
$r = 1 - \cos\theta$

$1 = 1 + \cos\theta$
$-1 \quad -1$

$0 = \cos\theta$

$\frac{2r}{2} = \frac{2}{2}$

$r = 1$



29. $r = 3 + 3\sin\theta$
$-r = -2$

$0 = 1 + 3\sin\theta$

$\frac{-1}{3} = \frac{3\sin\theta}{3}$

$-\frac{1}{3} = \sin\theta$

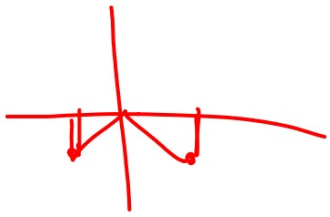
Search & destroy

$\sin^{-1}\left(\frac{1}{3}\right)$

$2 = 3 + 3\sin\theta$
$-3 \quad -3$

$-\frac{1}{3} = \frac{3\sin\theta}{3}$

0.34



(2, 3.48)

$(2, \pi + .34)$

$(2, 2\pi - .34)$

(2, 5.94)