Trig 9.2

Graph polar equations
Solve systems of polar equations

rose

lemniscate

limacon

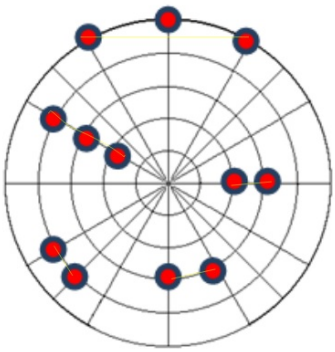
cardioid

spiral of Archimedes

activity: polar coordinate search & destroy
polar graphs and gallery walk

Polar Coordinate Search & Destroy

You have 3 destroyers (2x) and 2 battleships (3x).



Secretly place each ship along an arc OR segment on the polar coordinate graph. Use only the angles (30°, 45°, etc.) provided on the graph.

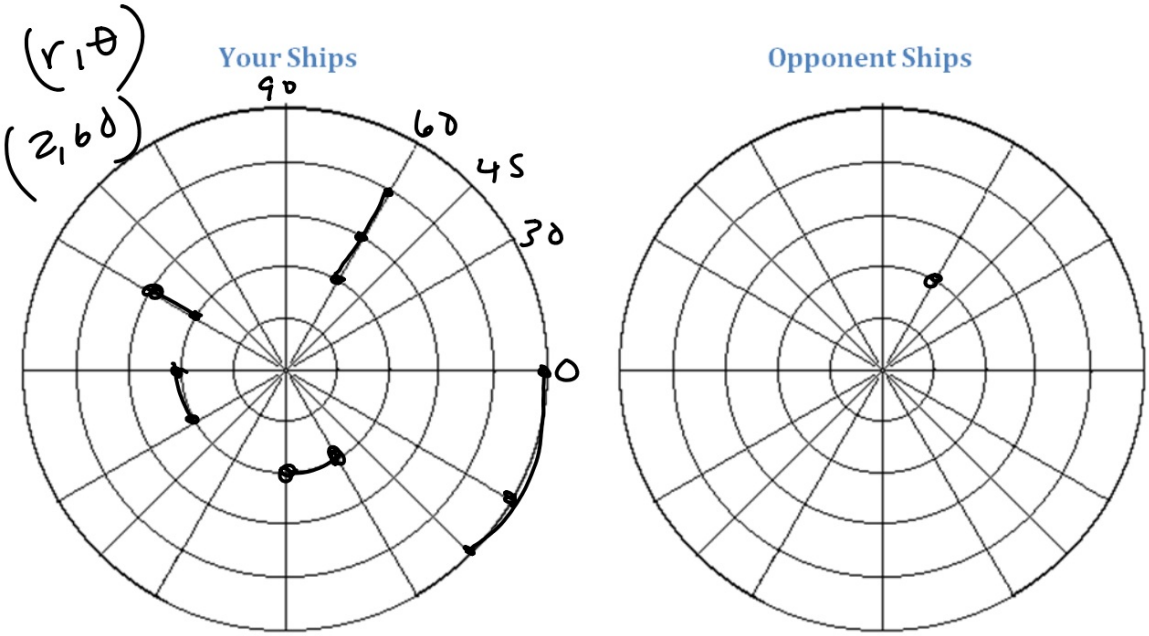
Players alternate naming polar coordinates (r,θ). Players may choose either degrees or radians to designate the angles.

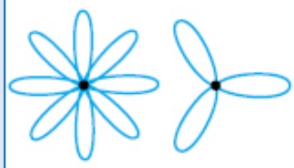
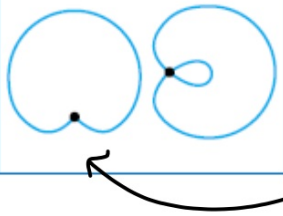
Your opponent will inform you whether a shot is a hit or miss. Mark your grid accordingly. If you repeat coordinates that have already been used, you lose your turn.

Object of the game: sink all of your opponent's ships.

(r, θ)

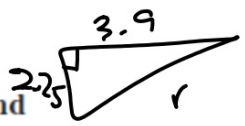
(2, 60)



Classical Curves					
Curve	rose	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					

$r = 3 - 3\sin 210$

$= 3 - 3 \cdot -\frac{1}{2} \quad 3 + 1.5$



4 Graph the system of polar equations. Solve the system using algebra and trigonometry and compare the solutions to those on your graph.

$\rightarrow r = 3 - 3\sin\theta$

$r = 4 - \sin\theta$

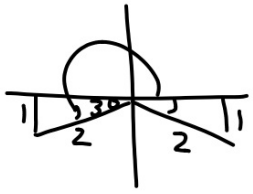
(r, θ)

$3 - 3\sin\theta = 4 - \sin\theta$

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

$\frac{-2\sin\theta}{-2} = \frac{1}{-2}$

$\sin\theta = -\frac{1}{2}$



$r = 3 - 3\sin 210$

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

$3 + 1.5$

$(4.5, 210)$

$(4.5, 330)$