Trig 9.2

Graph polar equations
Solve systems of polar equations

rose

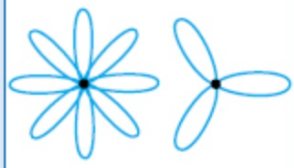
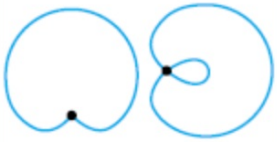
lemniscate

limacon

cardioid

spiral of Archimedes

activity: polar graphs and gallery walk

| 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** | $r = a \cos n\theta$<br>$r = a \sin n\theta$<br>*n is a positive integer.* | $r^2 = a^2 \cos 2\theta$<br>$r^2 = a^2 \sin 2\theta$ | $r = a + b \cos \theta$<br>$r = a + b \sin \theta$ | $r = a + a \cos \theta$<br>$r = a + a \sin \theta$ | $r = a\theta$<br>($\theta$ in radians) |
| **General Graph** |  |  |  |  |  |

$r = 3 - 3\sin 210$ $\quad$ $r = 3 - 3\sin 330$

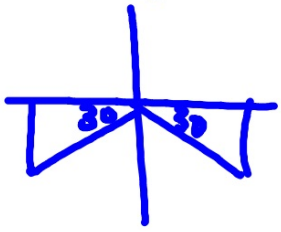
$r = 3 - 3(-\frac{1}{2})$ $\quad$ $= 3 - 3(-\frac{1}{2})$

$3 + 1.5$

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

$r = 3 - 3\sin\theta$ $\quad$ $3 + 1.5$

$r = 4 - \sin\theta$ $\quad$ $4.5$




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

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

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

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

(r, Θ)

$(4.5, 210°)$

$(4.5, 330°)$

$3.9^2 + 2.25^2 = r^2$

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

$r = 1 - \cos\theta$

$(1, 90°)$

$(1, 270)$.

11-21 o

25