

## 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

limaçon

lemniscate

rose

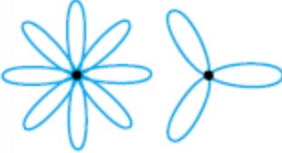

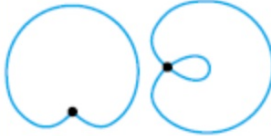
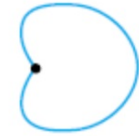

cardioid

spiral of Archimedes (radians)

Gallery walk: polar equations

graphing calculators

### Classical Curves

| Classical Curves          |   |   |  |   |   |
|---------------------------|---|---|--|---|---|
| <b>Curve</b>              | rose  | lemniscate<br><i>(pronounced<br/>leh-m NIHS kuh-t)</i>                              | limaçon<br><i>(pronounced<br/>lee-muh SOHN)</i>                                      | cardioid<br><i>(pronounced<br/>KARD ee oyd)</i>                                       | spiral of<br>Archimedes<br><i>(pronounced<br/>ar-kih MEED eez)</i>                    |
| <b>Polar<br/>Equation</b> | $r = a \cos n\theta$<br>$r = a \sin n\theta$<br><i>n is a positive integer.</i>     | $r^2 = a^2 \cos 2\theta$<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><i>(<math>\theta</math> in radians)</i>                              |
| <b>General<br/>Graph</b>  |  |  |  |  |  |

Identify the type of curve each represents.

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

$$7. r = \cos 2\theta$$

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

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

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

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

$$y = 2 \sin \theta$$

$$y = 2 \sin 2\theta$$

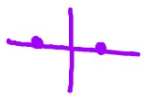
$$2 \sin 2\theta = 2 \sin \theta$$

$$2 \sin \theta \cos \theta = \sin \theta$$

$$2 \sin \theta \cos \theta - \sin \theta = 0$$

$$\sin \theta (2 \cos \theta - 1) = 0$$

$$\sin \theta = 0$$



$$2 \cos \theta - 1 = 0$$
$$\cos \theta = \frac{1}{2}$$



$$(0, 0^\circ)$$

$$(0, 180^\circ)$$

$$(\sqrt{3}, 60^\circ)$$

$$(-\sqrt{3}, 300^\circ)$$

$$*(\sqrt{3}, 120^\circ)$$