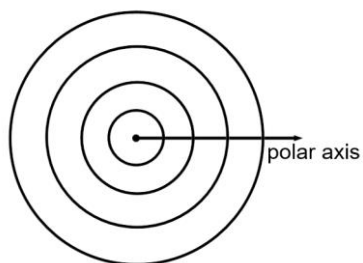


Write your questions and thoughts here!

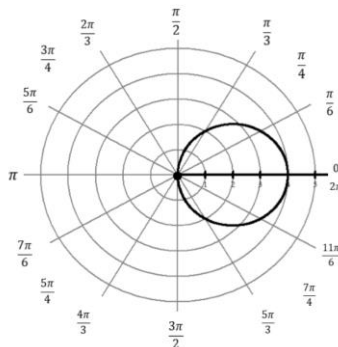
**Lines**

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



**Circles**

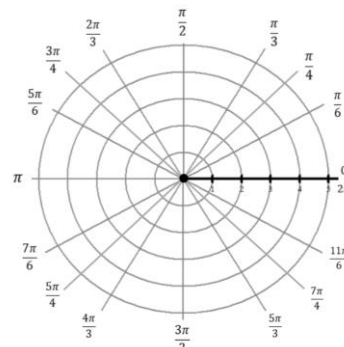
$$r = 4\cos \theta$$



Cycle:

Positive	Negative
----------	----------

$$r = 4\sin \theta$$



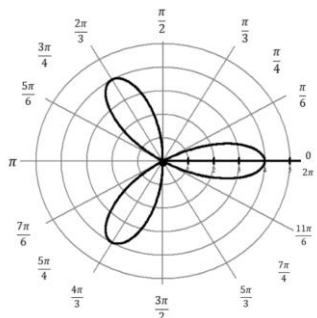
Cycle:

Positive	Negative
----------	----------

**Roses**

**Odd  $n$  Cosine**

$$r = 4\cos(3\theta)$$

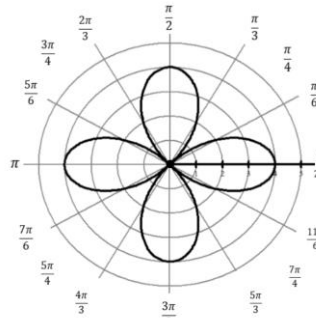


# of petals:

Cycle:

**Even  $n$  Cosine**

$$r = 4\cos(2\theta)$$

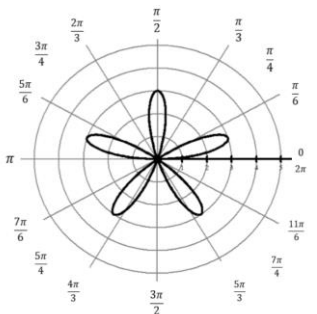


# of petals:

Cycle:

**Odd  $n$  Sine**

$$r = 3\sin(5\theta)$$

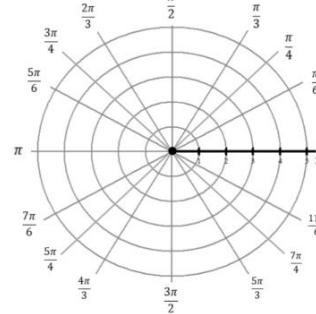


# of petals:

Cycle:

**Even  $n$  Sine**

$$r = 5\sin(4\theta)$$



# of petals:

Cycle:

Write your questions  
and thoughts here!

### Describe the polar function.

$$r = 2 \cos(7\theta)$$

Type:

Line      Circle      Rose  
Opens:      Petals:

Max distance from pole:

Cycle:

$$r = 9 \sin(\theta)$$

Type:

Line      Circle      Rose  
Opens:      Petals:

Max distance from pole:

Cycle:

$$r = 8 \sin(6\theta)$$

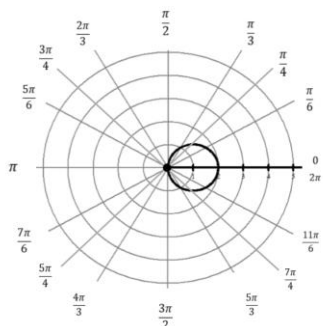
Type:

Line      Circle      Rose  
Opens:      Petals:

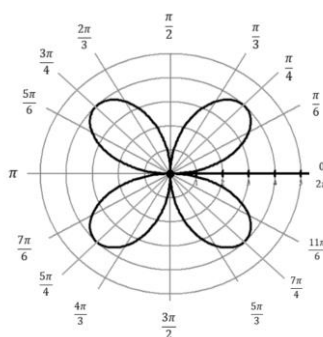
Max distance from pole:

Cycle:

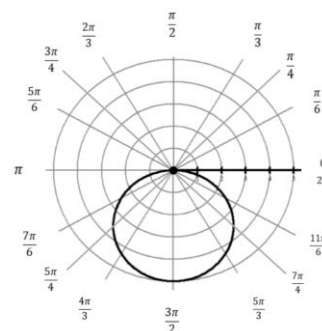
### Write the equation of the following polar functions. Answer the questions.



Equation:



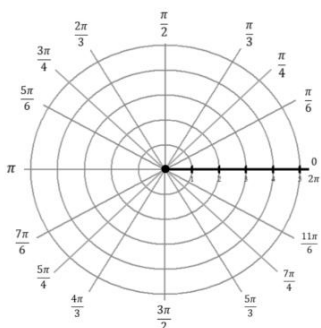
Equation:



Equation:

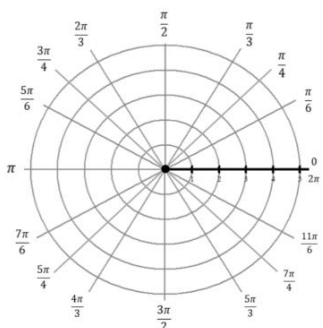
### Sketch a graph. Find the endpoints of the restricted domain and highlight on the function.

$$r = 3$$



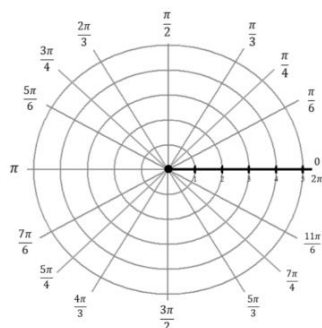
Endpoints of  $\frac{\pi}{6} \leq \theta \leq \pi$

$$r = 4 \cos(3\theta)$$



Endpoints of  $\frac{\pi}{6} \leq \theta \leq \frac{\pi}{3}$

$$r = 5 \sin(\theta)$$



Endpoints of  $\frac{\pi}{2} \leq \theta \leq \pi$

### 3.14A Polar Function Graphs

AP Precalculus

### 3.14A Practice

**Describe the equation of the polar function. Fill in the table.**

1.  $r = 6 \cos(5\theta)$

Type:

Line      Circle      Rose  
                  Opens:      Petals:

Max distance from pole:

Cycle:

$\theta$	$r$
$\frac{\pi}{6}$	
$\pi$	

2.  $r = 4 \sin(\theta)$

Type:

Line      Circle      Rose  
                  Opens:      Petals:

Max distance from pole:

Cycle:

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

3.  $r = 7$

Type:

Line      Circle      Rose  
                  Center:      Petals:

Max distance from pole:

Cycle:

$\theta$	$r$
$\frac{\pi}{4}$	
$\frac{3\pi}{2}$	

4.  $r = \cos(6\theta)$

Type:

Line      Circle      Rose  
                  Opens:      Petals:

Max distance from pole:

Cycle:

$\theta$	$r$
$\frac{\pi}{6}$	
$\frac{\pi}{2}$	

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

Type:

Line      Circle      Rose  
                  Opens:      Petals:

Max distance from pole:

Cycle:

$\theta$	$r$
	5
	-2

6.  $r = -8 \sin(3\theta)$

Type:

Line      Circle      Rose  
                  Opens:      Petals:

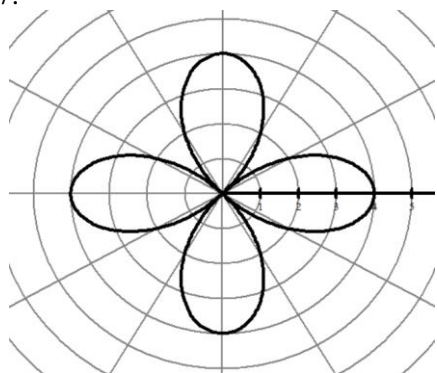
Max distance from pole:

Cycle:

$\theta$	$r$
$\frac{\pi}{4}$	
$\frac{\pi}{2}$	

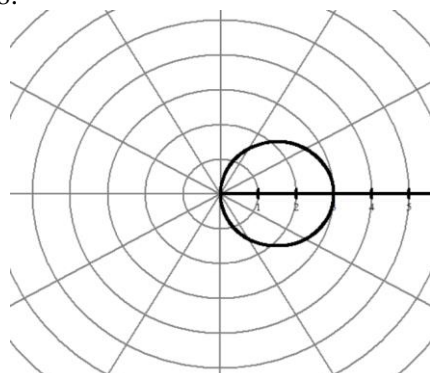
**Write the equation of the polar function.**

7.



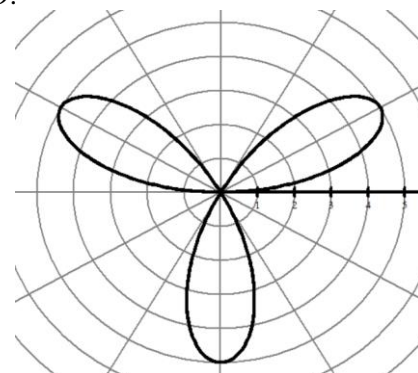
Equation:

8.



Equation:

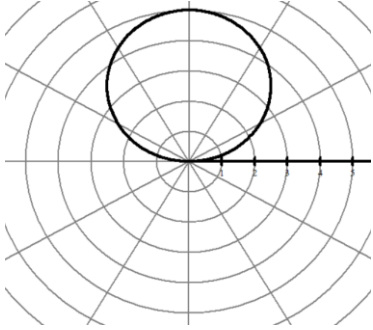
9.



Equation:

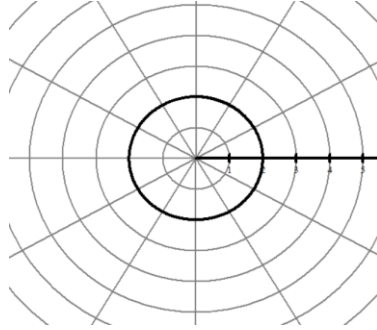
**Write the equation of the polar function.**

10.



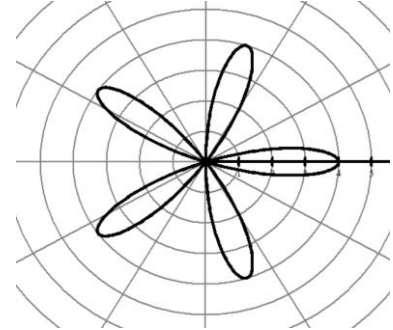
Equation:

11.



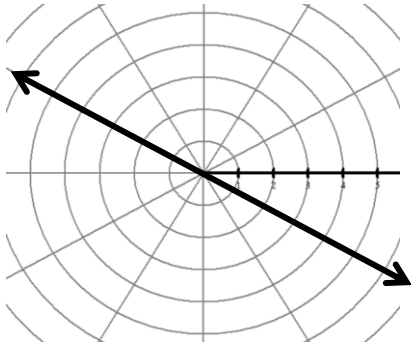
Equation:

12.



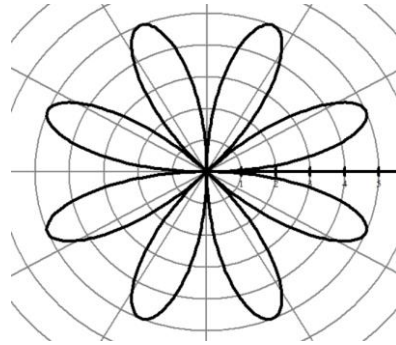
Equation:

13.



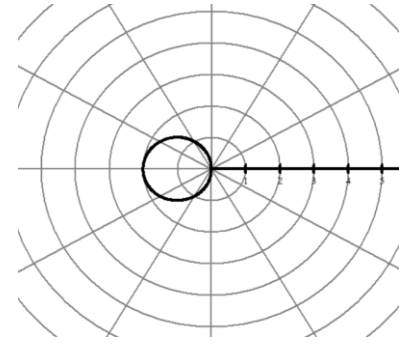
Equation:

14.



Equation:

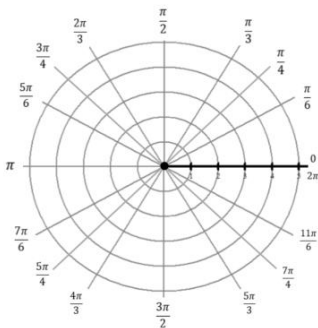
15.



Equation:

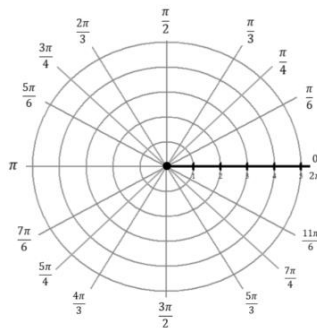
**Sketch a graph. Find the endpoints of the restricted domain and highlight this interval on the function. (Use graphing calculator to verify your answers)**

16.  $r = 3$



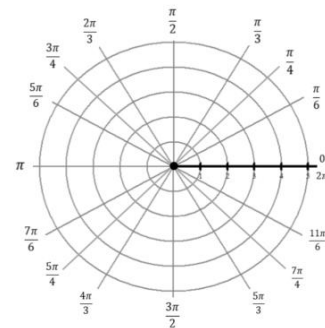
Endpoints of  $\frac{\pi}{6} \leq \theta \leq \pi$

17.  $r = 4 \cos(3\theta)$



Endpoints of  $\frac{\pi}{6} \leq \theta \leq \frac{\pi}{3}$

18.  $r = 5 \sin(\theta)$

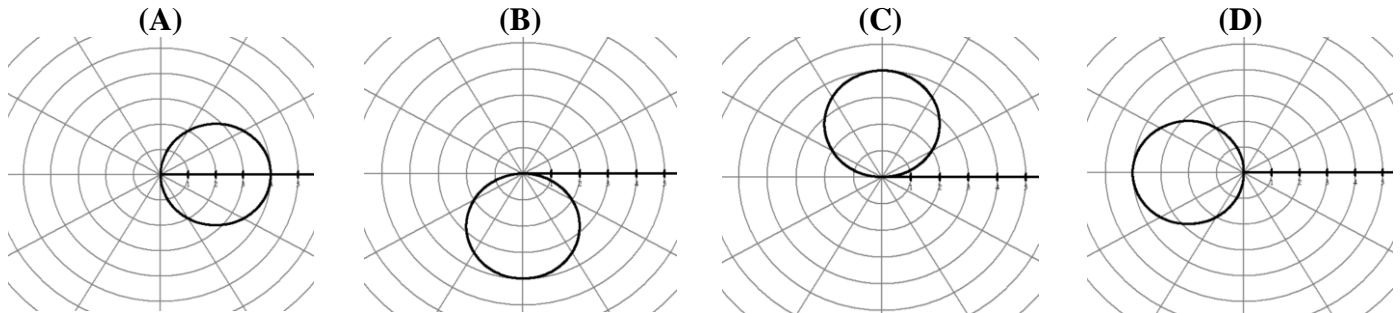


Endpoints of  $\frac{\pi}{2} \leq \theta \leq \pi$

### 3.14A Polar Function Graphs

## 3.14A Test Prep

19. Which of the following is the graph of the polar function  $r = f(\theta)$ , where  $f(\theta) = -4 \cos \theta$ , in the polar coordinate system for  $0 \leq \theta \leq 2\pi$  ?



20. The graph of polar function  $r = f(\theta)$  and  $r = g(\theta)$ , where  $f(\theta) = 4 \cos \theta$  and  $g(\theta) = -4 \sin \theta$ , in the polar coordinate system for  $0 \leq \theta \leq 2\pi$ . Which of the following is a possible polar coordinate for  $f(\theta) = g(\theta)$  ?

- (A)  $(2\sqrt{2}, \frac{\pi}{4})$
- (B)  $(2\sqrt{2}, \frac{3\pi}{4})$
- (C)  $(2\sqrt{2}, \frac{5\pi}{4})$
- (D)  $(2\sqrt{2}, \frac{7\pi}{4})$

21. The graph of the polar function  $r = f(\theta)$ , is given the polar coordinate system. Which of the following defines  $f(\theta)$  for  $0 \leq \theta \leq 2\pi$  ?

- (A)  $f(\theta) = 3 \sin(2\theta)$
- (B)  $f(\theta) = 3 \sin(4\theta)$
- (C)  $f(\theta) = 3 \cos(2\theta)$
- (D)  $f(\theta) = 3 \cos(4\theta)$

