

## Practice Worksheet: Polar Coordinates

1. Find a polar ordered pair  $(r, \theta)$  that's plotted at the same location as the given rectangular ordered pair  $(x, y)$ . Answers should be ordered pairs involving exact values, with  $\theta$  in radians.

a.  $(x, y) = (-4, -4)$

b.  $(x, y) = (6, -6\sqrt{3})$

2. Find a polar ordered pair  $(r, \theta)$  that's plotted at the same location as the given rectangular ordered pair  $(x, y)$ . Answers should be ordered pairs involving approximations of  $\theta$  in radians.

a.  $(x, y) = (10, -2)$

b.  $(x, y) = (-3, 7)$

3. Find a rectangular ordered pair  $(x, y)$  that's plotted at the same location as the given polar ordered pair  $(r, \theta)$ . Answers should be ordered pairs involving exact values.

a.  $(r, \theta) = \left(5, \frac{2\pi}{3}\right)$

b.  $(r, \theta) = (16, 210^\circ)$

4. Find a rectangular ordered pair  $(x, y)$  that's plotted at the same location as the given polar ordered pair  $(r, \theta)$ . Answers should be ordered pairs involving approximate values.

a.  $(r, \theta) = (3, 80^\circ)$

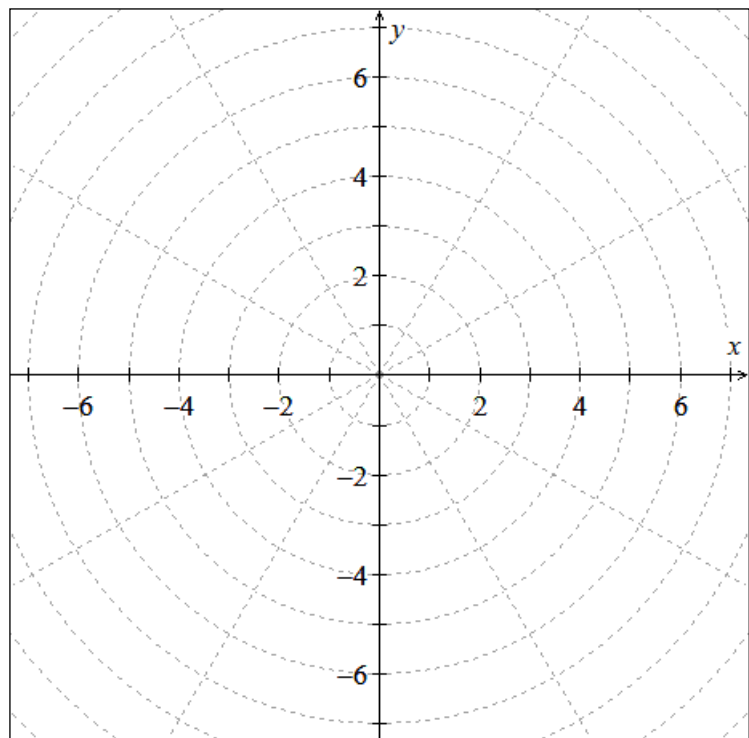
b.  $(r, \theta) = \left(7, -\frac{\pi}{10}\right)$

5. The polar ordered pair  $(5, \frac{\pi}{3})$  can be plotted as a “dot” on the polar coordinate plane. List four other (different) polar ordered pairs that are plotted on the same “dot.” Use “ $r = -5$ ” for at least one of your ordered pairs.

6. Complete the 1<sup>st</sup> column of the table below with appropriate multiples of  $\frac{\pi}{6}$ ,  $\frac{\pi}{4}$ , and  $\frac{\pi}{3}$ ; then determine the corresponding values of  $r$  if  $r = 6 \cos(2\theta)$  in order to complete the 2<sup>nd</sup> column of the table; then plot the points implied by each of the 16 rows of the table on the polar plane below and connect those points in order to draw a graph of  $r = 6 \cos(2\theta)$ .

(HINT: Graph the function in Desmos so that you can predict its shape before you draw it.)

	$\theta$	$r$
	0	
Quad. 1 angles		
	$\frac{\pi}{2}$	
Quad. 2 angles		
	$\pi$	
Quad. 3 angles		
	$\frac{3\pi}{2}$	
Quad. 4 angles		



Draw a graph of  $r = 6 \cos(2\theta)$ .