Week __ Practice Worksheet

Polar Coordinates

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

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

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

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

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, θ). Answers should be ordered pairs involving exact values.

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

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

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

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

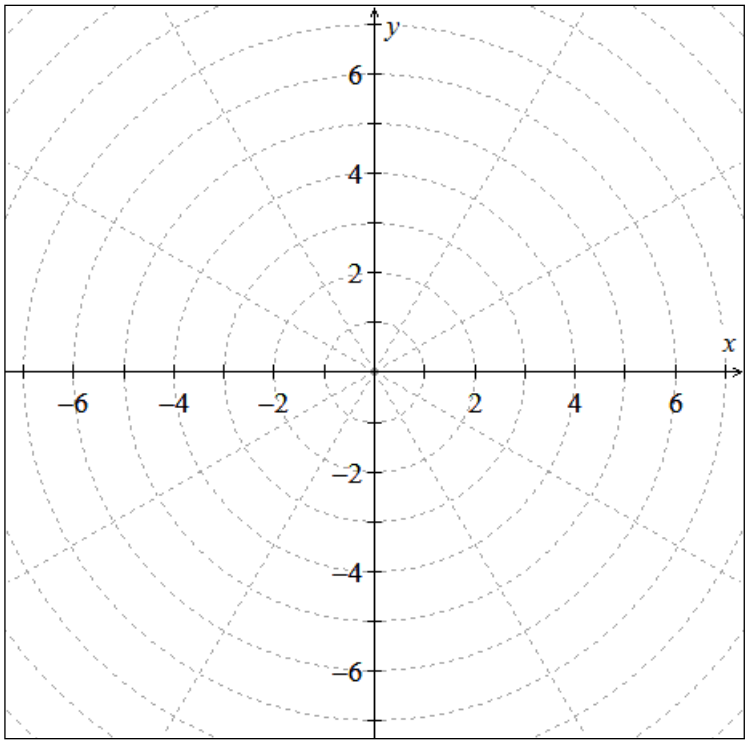
b. $(r, \theta) = \left(7, -\frac{\pi}{10}\right)$

5. The polar ordered pair $\left(5, \frac{\pi}{3}\right)$ 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 1st 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 2nd 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.)

	θ	r
	0	
Quad. 1 angles		
	$\pi/2$	
Quad. 2 angles		
	π	
Quad. 3 angles		
	$3\pi/2$	
Quad. 4 angles		



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

7. Express the complex number $z = 10e^{i\cdot\frac{11\pi}{6}}$ in the form $z = a + bi$.

8. Express the complex number $z = 8e^{i\cdot\frac{2\pi}{3}}$ in the form $z = a + bi$.

9. Express the complex number $z = -7e^{i\cdot\frac{5\pi}{4}}$ in the form $z = a + bi$.

10. Find a polar form, $z = re^{i\theta}$, of the complex number $z = -3 - 3\sqrt{3}\,i$.

11. Find a polar form, $z = re^{i\theta}$, of the complex number $z = 2 - 2i$.

12. Find a polar form, $z = re^{i\theta}$, of the complex number $z = -4\sqrt{3} + 12i$.

13. Find three different a polar forms, $z = re^{i\theta}$, of the complex number $z = 4i$. (HINT: $i = 0 + 4i$ can be associated with the point $(0, 4)$ so find three different angles that can be used to represent the "direction of this point" and use each angle to create a polar form.)