Polar Coordinates Review – Part I
Pre-Calculus

Name:
Date: Period:

Find 2 sets of polar coordinates for each point given in rectangular coordinates – one set with $r > 0$ and one set with $r < 0$

1.

$(0,-4)$		

2.

$\left(-\sqrt{6},\sqrt{2}\right)$		

3.

$\left(5\sqrt{2},-5\sqrt{2}\right)$		

Give rectangular coordinates for each point given in polar coordinates

4.

$\left(-1,\frac{-5\pi}{3}\right)$		

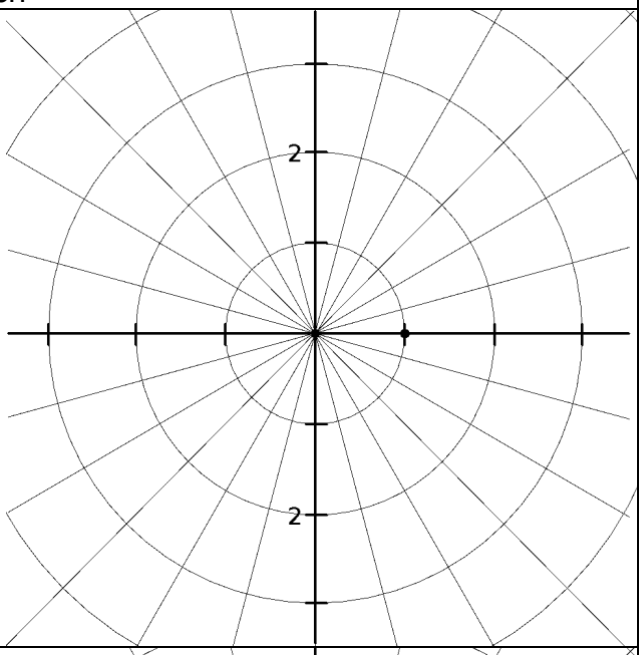
5.

$\left(-2,\frac{3\pi}{4}\right)$		

Graph each polar equation. Show a table of values for each

6. $r = 2\sin 3\theta$, $0 \le \theta \le \pi$

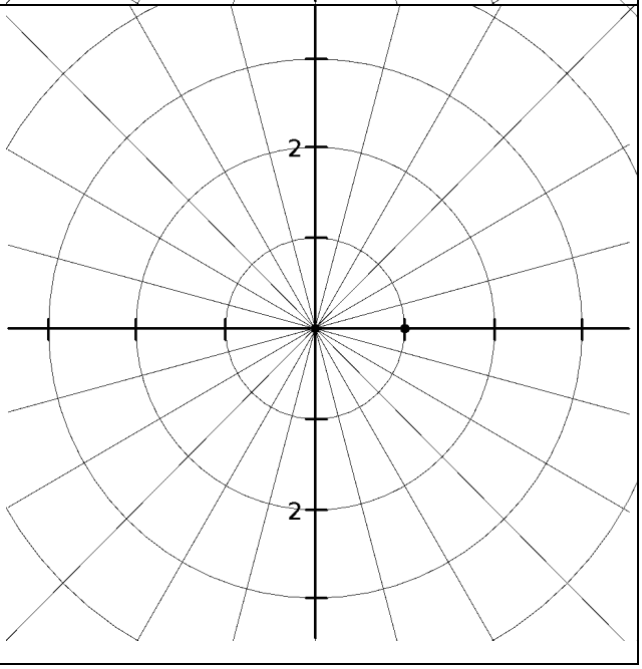
θ	0	$\frac{\pi}{12}$	$\frac{\pi}{6}$	$\frac{\pi}{4}$	$\frac{\pi}{3}$	$\frac{5\pi}{12}$	$\frac{\pi}{2}$	$\frac{7\pi}{12}$	$\frac{2\pi}{3}$	$\frac{3\pi}{4}$	$\frac{5\pi}{6}$	$\frac{11\pi}{12}$	π
3θ													
$\sin 3\theta$													
$2\sin 3\theta$													



7. $r = 2\sin\theta - 1$, $\pi \le \theta \le 2\pi$

θ	0								π

θ								2π



Convert each rectangular equation to a polar equation **AND SOLVE for r** (polar equation that expresses r in terms of θ.
Convert each polar equation to a rectangular equation – simplify as much as possible.

8. $3x + y = 7$

9. $(x-2)^2 + y^2 = 4$

10. $y^2 = 6x$

11. $r = 6\cos\theta + 4\sin\theta$

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

Given that $z_1 = 4\left(\cos\frac{\pi}{12} + i\sin\frac{\pi}{12}\right)$ and $z_2 = 2\left(\cos\frac{5\pi}{12} + i\sin\frac{5\pi}{12}\right)$, find each of the following in both polar and $a + bi$ form

13. $z_1 \cdot z_2$

14. $\frac{z_1}{z_2}$

15. Use de Moivre's Theorem to compute: $\left(-\sqrt{2} + i\sqrt{2}\right)^3$

Use de Moivre's Theorem to find the cube roots in both polar and standard form

16. $-8i$

Polar Coordinates Review – Part II
Pre-Calculus

Name:
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Given that $z_1 = \sqrt{6}\left(\cos\frac{2\pi}{3} + i\sin\frac{2\pi}{3}\right)$ and $z_2 = 2\sqrt{3}\left(\cos\frac{3\pi}{2} + i\sin\frac{3\pi}{2}\right)$, find each of the following in both polar and $a+bi$ form

17. $z_1 \cdot z_2$

18. $\frac{z_1}{z_2}$

19. Use de Moivre's Theorem to compute: $\left(2\sqrt{6} - 2\sqrt{2}\,i\right)^4$

Use de Moivre's Theorem to find the indicated roots in both polar and standard form

20. Complex cube roots of $-i$

21. Complex fourth roots of $1+i$

22. Complex fifth roots of $-1+i$

23. Complex square roots of $25\left(\cos\frac{7\pi}{6} + i\sin\frac{7\pi}{6}\right)$

24. Complex cube roots of $27\left(\cos\frac{3\pi}{2}+i\sin\frac{3\pi}{2}\right)$

25. Complex fourth roots of $81\left(\cos\frac{4\pi}{3}+i\sin\frac{4\pi}{3}\right)$

One of the four 4th roots of $a+bi$ is $2\left(\cos\frac{\pi}{12}+i\sin\frac{\pi}{12}\right)$

26. find the other 3 roots

27. find the number $a+bi$

Given the graph of the roots of a complex number:

28. Write each of the roots in complex form.

29. Identify the complex number whose roots are given.