Worksheet 11 – 4 Name _____ Assignment _____

YOU MUST DO YOUR WORK ON A SEPARATE PIECE OF PAPER for # 1 – 22 for full credit. NO EXCEPTION!!!

Use De Moivre's theorem to express the following in polar and rectangular form.

1. $(2 \text{ cis } 45°)^2$

2. $\left(\sqrt{2}cis\left(-18^\circ\right)\right)^4$

3. $\left(4cis\frac{\pi}{6}\right)^3$

4. $\left(\sqrt{3}cis\frac{5\pi}{6}\right)^6$

5. $\left(1+i\right)^8$

6. $\left(1-i\right)^{10}$

7. $\left(-1+\sqrt{3}i\right)^{-3}$

8. $\left(-\sqrt{3}-i\right)^{-5}$

9. Find the cube roots of $-27i$

10. Find the cube roots of -64

11. Find the square roots of $-1+i\sqrt{3}$

12. Find the cube roots of -1

13. $2\sqrt{3}+2i$ (express in polar form)

14. 8 cis 230° (in rectangular form)

15. $(2\sqrt{3},2)$ (express in polar form)

16. (8, 240°) (in rectangular form)

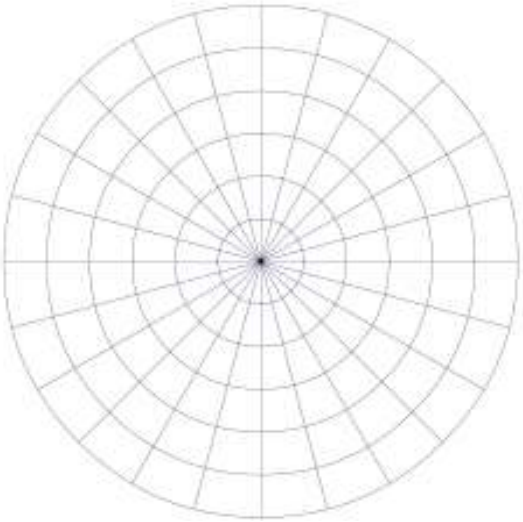
17. $\left(2cis115°\right)\left(cis65°\right)$

18. $w=6cis120°; z=3cis150°$. Find $\frac{w}{z}$

19. Find 4 polar coordinates for $\left(\frac{1}{2},\frac{-\sqrt{3}}{2}\right)$ (2 pos r, 2 neg r)

20. Find 4 polar coordinates for (0, -4)

21. Graph $2cos\theta - 3$



Answers:

1. Polar: 4 cis 90° Rectangular: 4i
2. Polar: 4 cis 288° Rectangular: 1.236 -3.804 i
3. Polar: $64cis\frac{\pi}{2}$ Rectangular; 64 i
4. Polar: 27 cis π Rectangular: -27

5. 16 6. -32i 7. 1/8 8. $\frac{\sqrt{3}}{64}+\frac{1}{64}i$

9. 3i; $\frac{-3\sqrt{3}}{2}-\frac{3}{2}i;\frac{3\sqrt{3}}{2}-\frac{3}{2}i$ 10. $2+2\sqrt{3}i;-4;2-2\sqrt{3}i$

11. $\frac{\sqrt{2}}{2}+\frac{\sqrt{6}}{2}i;-\frac{\sqrt{2}}{2}-\frac{\sqrt{6}}{2}i$ 12. $\frac{1}{2}+\frac{\sqrt{3}}{2}i;-1;\frac{1}{2}-\frac{\sqrt{3}}{2}i$ 13. 4 cis 30°

14. -5.142-6.128 i 15. (4, 30°) no cis!!! 16. $(-4,-4\sqrt{3})$ no i!

17. -2 18. $\sqrt{3}-i$ 19. (1, 300°) ; (1, -60°) ; (-1, 120°); (-1, -240°)

20. (4, 270°); (4, -90°); (-4, 90°); (-4, -270°)

21.