Precalc Honor 11-3 DeMoivre's Theorem Name: _____________

1. Change each complex number into polar form, then find each of the following. Look for patterns!

a. $\left(4\sqrt{3}+4i\right)^2$

b. $\left(4\sqrt{3}+4i\right)^3$

c. $\left(4\sqrt{3}+4i\right)^n$

DeMoivre's Theorem: If z=r(cos θ+ i sin θ) and n is an integer, then z^n=

2. Let z= $1.5\left(\cos\frac{\pi}{4}+i\sin\frac{\pi}{4}\right)$. Calculate z^n for n= 1, 2, 3, 4, 5.

$z^1 =$

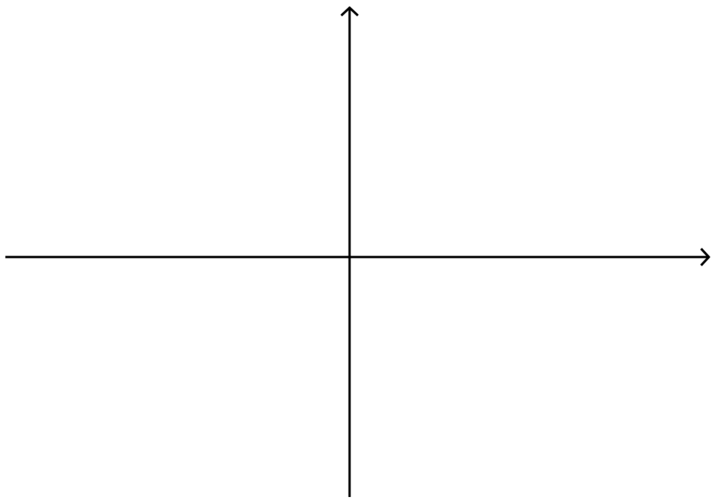
$z^2 =$

$z^3 =$

$z^4 =$

$z^5 =$

b. Plot these powers of z. What do you notice?



3. Compute $\left(\sqrt{3}-i\right)^4$ and express your answer in rectangular form. (Change the number to polar form, raise to the fourth power then change back to rectangular form. Yes, this is the easiest way.)

4. Let z=-1. Use DeMoivre's theorem to show that the positive powers of z are alternately ± 1. Remember that $z=-1=-1+0i$. Change this to polar form and find the following powers of z:

$z^1 =$

$z^2 =$

$z^3 =$

$z^4 =$