Math 119 – Chapter 12.6 (Multiplying and Dividing in Polar form)

The objective for this section includes

- Multiply, divide, and raise to a power complex numbers in exponential and polar form
- Take roots of complex numbers

Let's take a minute to understand why when you multiply complex numbers in either polar or exponential form that you multiply their *r* values and add their angles:

Multiply or Divide complex numbers below in polar form.

1. $\left[12(\cos 47° + j\sin 47°)\right]\left[11(\cos 112° + j\sin 112°)\right]$

2. $\left[32(\cos 157° + j\sin 157°)\right]\left[0.75(\cos 62° + j\sin 62°)\right]$

Let's take a minute to understand why when you divide complex numbers in either polar or exponential form that you divide their *r* values and subtract their angles:

3. $\dfrac{12(\cos 70° + j\sin 70°)}{6(\cos 110° + j\sin 110°)}$

4. $\dfrac{42(\cos 270° + j\sin 270°)}{6(\cos 153° + j\sin 153°)}$

5. $\dfrac{12\angle 292°}{5\angle -96°}$

6. $\dfrac{(25\angle 194°)(6\angle 239°)}{(30\angle 17°)(10\angle 29°)}$

Let's take a minute to understand why when you raise complex numbers to a power in either polar or exponential form that you raise their *r* values to the power and multiply their angles:

7. $[3(\cos 120° + j\sin 120°)]^4$

8. $(-1 - j)^8$

9. Perform the indicated operation (BE CAREFUL): $15.9\angle 142.6° - 18.5\angle 71.4°$

10. Perform the indicated operation (BE CAREFUL): $287.5\angle 326.5° - 629.3\angle 96.4°$

Math 119 – Chapter 12.6 (Multiplying and Dividing in Polar form)

Let's explain taking roots of complex numbers using DeMoivre's theorem:

11. Find the three cube roots of $27(\cos 120° + j\sin 120°)$

12. Find the square roots of $1 + j$