Remote Lesson 4.5 (OPTIONAL)

This would be a review of imaginary and complex numbers.

Imaginary Numbers

Powers of *i*

If we continue,

Moving forward, we would watch the pattern repeat, because every is a 1, so we would see the same cycle ( repeat. Consider when we get to , we are in essence multiplying two 1s.

So if we were trying to simplify , we would want to first think of that as 43 i’s next to each other. Using the pattern above if we group them in fours, every 4 i’s together would represent a 1. So what we do is group our exponents in 4s (that is , meaning we have 10 . All of these have a value of 1, so Now the leftovers, we have

So

Example: Simplify

Complex Number: any number of the form .

Operations with Complex Numbers

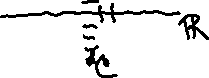
1. (Gather like terms)
2. (again, gather like terms)
3. (
4. −
5. notice the issue here is the in the denominator (a square root)

1. (This is called a complex conjugate)

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Graphing Complex Numbers in Rectangular Form: Recall, rectangular form is a coordinate plane. Since every number has a real and an imaginary part, we will simply rename the axes to real and imaginary

Example: Graph the following in rectangular form



So every complex number, , can be graphed in a rectangular form, . We learned we can take rectangular coordinates and make them into polar coordinates, . Recall, and

. There is a fourth form in which we can write a number.

Consider: . (Think we would make into .

Then we would change to polar

So:

**TRIG FORM OF A COMPLEX NUMBER**

**Summarizing**

**Complex:**

**Rectangular:**

**Polar:**

**Trig: (this is sometimes abbreviated to**

**Example:** Change to its other forms.

Complex: Changing to rectangular would be

Rectangular:

Polar:

Trig: the values from polar just translate into trig form

\*\*Note, if you evaluate trig form, it takes you back to complex!

Example: Change to its other forms

Rectangular:

Polar: (because rectangular pair is in Q2)

Trig:

HW:  p. 539 3,7,11,15,19,23,27,53

                 p. 558 1,5,9,13,17,21,25

**\*\* You are responsible for material on p. 227 (1-47).  This should be review.**