MATH 5010

***Graphing Complex Numbers***

***Lesson Plan***

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**Topic:** Graphing Complex Numbers

**Connection to Core Curriculum:** Standard N.CN.2

Use the relation *i*2 = –1 and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers. Limit to multiplications that involve *i*2 as the highest power of *i*.

**Overview:** This activity will allow for students to expand their understanding of complex numbers and how to graph them. It will allow for them to reach an understanding of graphing the product of complex numbers by building from a foundation of addition and subtraction. Graphically representing addition, subtraction and multiplication of complex numbers will give a different perspective of how complex numbers can be visualized.

**Objectives:** Participants will be able to take a problem in which they are to multiply two complex numbers and find the solution by graphing the two numbers.

**Materials Needed:** Students will need the worksheet we created and an applet. The applet address is: https://www.desmos.com/calculator/n1698xdz63

**Technology:** Each student will need a laptop to participate. Laptops will be used to work with an applet from Desmos on which students can play around with graphing complex numbers.

**Role of Technology:** The applet used will give participants the opportunity to learn more about the multiplication of complex numbers and how it can be visualized. The app will allow for exploration and discovery of the relationship between the vectors of the two complex numbers and their product (visually). The applet can check their work on the worksheet and reduce the amount of time spent on tedious calculations.

**Activity Plan:** Most of our students have background knowledge of complex numbers, so we will give them the worksheet and allow them to work at their own pace. We will wander around listening and asking questions.

Some areas in which we think students will struggle (and which we have discussed to prepare ourselves) are…

--Reminders about where to put the tails and ends of the vectors as they are added and subtracted.

--The resulting vector that is the “answer” to each of the problems they will be doing.

--The fact that the axes “shift” when we multiply complex numbers.

--The fact that the length of the first vector becomes the unit length to create the second vector.

**Included documents:** Worksheet attached as a separate document.

**References:**

Utah State Board of Education. (n.d.). *Secondary Mathematics Core*. Retrieved from Utah Education Network: https://www.uen.org/core/math/7-12.shtml

This is the website is where we found the core curriculum standard that correlated with this activity.