**Algebra II Unit 2: Radical Operations and Complex Numbers**

**Universal Essential Question: How do we use mathematics to communicate real world phenomena?**

**Content Essential Question: Why do we need to extend the number system?**

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| **Learning Objectives**At the completion of this unit, I should … | **Self-Rating, what you understand/don’t yet understand and (last column only) how you learned it**0 – I have no idea.1 – I cannot solve problems yet but I am beginning to understand the strategies2 – I can solve problems but do not yet know why the math works.3 – I understand why the math works and can solve most problems but still make mistakes.4 – I understand why the math works and can consistently and accurately solve problems.  |
| **Know** * Vocabulary associated with radicals
* Properties of radical operations
* The conjugate of a radical or complex number
* Vocabulary associated with complex numbers
* The history of *i*
* Properties of complex number operations
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| **Be able to*** Operate with rational exponents
* Add, subtract, multiply, and divide radicals
* Rationalize the denominator using the conjugate
* Solve radical equations
* Identify patterns in the real and imaginary number system
* Add and subtract complex numbers
* Multiply and divide complex numbers including using the conjugate
* Graph complex numbers on the complex plane
* Find the absolute value of a complex number
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| **Understand*** Why imaginary numbers exist
* How operations with radicals connect with complex number operations
* Graphs of real vs. complex numbers
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**Vocabulary:**

Square root

Radical

Radicand

Rationalize

Conjugate

Imaginary unit

Imaginary number

Complex number

Pure imaginary number

Standard form of a complex number

Complex conjugate

Complex plane

Absolute value of a complex number

Radical equations

Extraneous solution

**Reflection:**

1. Create a Venn Diagram to compare and contrast real numbers vs. complex numbers (include graphs and operations)
2. Give one thoughtful example of how we use the mathematics in this unit to communicate real world phenomena.