Richmond Public Schools

Curriculum Framework

Algebra II

Strand: Expressions and Operations	
AII.2	**The student will perform operations on complex numbers and express the results in simplest form using patterns of the powers of *i*.**
Suggested Pacing	
2 Class Periods	
Spiraling Standards	
8.2-The student will describe the relationships between the subsets of the real number system. 8.3-The student will a) estimate and determine the two consecutive integers between which a square root lies; and b) determine both the positive and negative square roots of a given perfect square. A.3-The student will simplify a) square roots of whole numbers and monomial algebraic expressions; b) cube roots of integers; and c) numerical expressions containing square or cube roots.	MA.7-The student will perform operations with vectors in the coordinate plane and solve practical problems using vectors. MA.9-The student will investigate and identify the characteristics of the graphs of polar equations.
Essential Questions	**Common Misconceptions**
How are real, imaginary, and complex numbers related? What properties extend from the real numbers to the complex numbers? What is the relationship between a complex number and its conjugate? What are the patterns of the powers of i?	• Students may still feel that a negative square root is impossible and not solve the problem • Students may assume that equations with no real solutions, have no solution at all instead of a complex solution. • Students may not perform operations properly regarding integer rules

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Understanding the Standard	Essential Knowledge and Skills
• A complex number multiplied by its conjugate is a real number. • Equations having no real number solutions may have solutions in the set of complex numbers. • Algebraic properties apply to complex numbers as well as real numbers. • All complex numbers can be written in the form $a + bi$ where a and b are real numbers and i is the imaginary unit that satisfies the equation $i^2 = -1$ (e.g., $3 + 2i$; $\pm\sqrt{-9} = 0 \pm 3i$; $5 = 5 + 0i$).	**The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to** • Recognize that the square root of –1 is represented as i. • Simplify radical expressions containing negative rational numbers and express in $a + bi$ form. • Simplify powers of i. • Add, subtract, and multiply complex numbers.
Vocabulary	**Instructional Activities Organized by Learning Objective**
complex numbers, simplest form, powers, field properties, valid, subset, conjugate, equation, root, simplify, radical, expression, rational number, pure imaginary number, irrational number	**Textbook** Eureka Math Algebra 2 Module 1 Topic D Algebra 2, ©2012, Price, et al, McGraw-Hill page(s) 276 - 282 **Notes** Complex Numbers (Math Is Fun) **Resources** • **Print** Coach book, Virginia edition, lesson 6 , 7 & 8 of chapter 1 VDOE Lesson Plan AII.2 • **Technology-based** Complex Numbers (Khan Academy) **Station Activities**
Assessment	
Common Assessment AII.2	

	Complex Numbers Think Fast
Cross-Curricular Connections	**Tiered Differentiations**
Science- Imaginary numbers are used in electricity (circuits and currents). They are also used in explaining aspects in automotives, liquid flow, air flow, etc.	**Tier 1**-students may be given expressions in both complex and radical form **Tier 2**-students will simplify binomial and polynomial expressions **Tier 3**- students may start with complex monomials expressions before simplifying binomials expressions.