Algebra 1 Honors Unit 8: Radicals

Unit #:	APSDO-00017752	Duration:	4.0 Week(s)	Date(s):	

Team:
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Grades:
8, 8 (Honors), 9
Subjects:
Mathematics

Unit Focus

In this unit, Honors students will solve quadratic equations, simplify radical expressions, rationalize the denominator using the conjugate, operate with radicals, and solve radical equations (including extraneous solutions). Honors students will be expected to construct viable arguments by proving and applying the Pythagorean Theorem, deriving the distance formula and quadratic formula, and writing solutions in simplified radical form. Primary instructional materials for this unit include Algebra I, Glencoe/McGraw Hill, 2014. Secondary resources will be added to ensure the complexity, sophistication, and authenticity of the types of problems for our Honors students.

Stage 1: Desired Results - Key Understandings

Established Goals	Transfer
Common Core *Mathematics: 8* • Explain a proof of the Pythagorean Theorem and its converse. *CCSS.MATH.CONTENT.8.G.B.6* • Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions. *CCSS.MATH.CONTENT.8.G.B.7* • Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.	**T1** (T50) Based on an understanding of any problem, initiate a plan, execute it and evaluate the reasonableness of the solution. **T2** (T53) Articulate how mathematical concepts relate to one another in the context of a problem or in the theoretical sense. **T3** (T51) Examine alternate methods to accurately and efficiently solve problems. **T4** (T52) Use appropriate tools strategically to deepen understanding of mathematical concepts. **T5** (T20) Compose and decompose numbers to establish relationships, perform operations, and solve problems. **T6** (T21) Perform operations in a conventional order within the real and complex number system. **T7** (T22) Describe and/or solve problems using algebraic expressions, equations, inequalities, and functions.

CCSS.MATH.CONTENT.8.G.B.8	Meaning	

Mathematics: 9

- Solve quadratic equations by inspection (e.g., for x2 = 49), taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as a +/- bi for real numbers a and b. *CCSS.MATH.CONTENT.HSA.REI.B.4.B*
- Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise. *CCSS.MATH.CONTENT.HSA.REI.A.2*
- Calculate the distance between numbers in the complex plane as the modulus of the difference, and the midpoint of a segment as the average of the numbers at its endpoints. *CCSS.MATH.CONTENT.HSN.CN.B.6*
- Look for and make use of structure. *CCSS.MATH.MP.7*
- Make sense of problems and persevere in solving them. *CCSS.MATH.MP.1*

Meaning

Understandings	Essential Questions
U1 (U201) The same value can be represented in multiple ways. **U2** (U202) The application of specific properties and order of operations can simplify expressions, solve equations, and combine functions. **U3** (U203) Certain mathematical manipulations preserve the relationship in an expression or equation, even though they change the representation. **U4** (U501) Effective problem solvers identify relevant information. **U5** (U502) Effective problem solvers identify and apply an appropriate model, tool, or strategy. **U6** (U562) Mastery of basic facts and rules maximizes conceptual and procedural fluency.	**Q1** (Q200) What rule or pattern can help me simplify the expression or solve this problem? **Q2** (Q203) What is the relationship between/among these values? **Q3** (Q204) What is the value of this number/ relationship and how can I represent it in different ways? **Q4** (Q500) What is a reasonable estimate? **Q5** (Q503) What strategies/approaches are best for this problem? **Q6** (Q504) What do I do when I get stuck? **Q7** (Q505) Is my answer correct? OR Does my solution make sense? **Q8** (Q563) How does being fluent with basic facts and rules help me solve a complex problem?

Acquisition of Knowledge and Skill

Knowledge	Skills
	S1 solve quadratic equations (ex. $x^2=49$) **S2** simplify radical expressions **S3** rationalize the denominator by using the conjugate **S4** operations with radicals

| | | **S5**

solve radical equations (including extraneous solutions)

S6

prove and apply the Pythagorean Theorem, distance formula, and quadratic formula

S7

understand reasons for rationalizing the denominator (integer denominators)

S8

understand extraneous solutions |

Stage 3: Learning Plan

Coding	Code	Description of Learning Activity