



Pre-College Algebra & Trigonometry - Unit 6 - Radicals, Exponents, and Logarithms

Unit Focus

This unit will help students build fluency with radicals and rational exponents. They should know why negative exponents mean “divide” and rational exponents are equivalent to radical notation. We want students to know that a logarithm is used to solve for a variable in the exponent. Logarithms are a way to solve difficult (near impossible) problems in a fast, easy way. Use the language for rational exponents: “ $8^{(2/3)}$ ” means: 2 of the 3 ‘identical factors’ that multiply to 8.”

Stage 1: Desired Results - Key Understandings

Standard(s)	Transfer	
Common Core Mathematics: 9-12 - Explain how the definition of the meaning of rational exponents follows from extending the properties of integer exponents to those values, allowing for a notation for radicals in terms of rational exponents. (CCSS.MATH.CONTENT.HSN.RN.A.1) - Rewrite expressions involving radicals and rational exponents using the properties of exponents. (CCSS.MATH.CONTENT.HSN.RN.A.2) - Use the properties of exponents to interpret expressions for exponential functions. For example, identify percent rate of change in functions such as $y = (1.02)^t$, $y = (0.97)^t$, $y = (1.01)12^t$, $y = (1.2)^{1/10}$, and classify them as representing exponential growth or decay. (CCSS.MATH.CONTENT.HSF.IF.C.8.B) - Understand the inverse relationship between exponents and logarithms and use this relationship to solve problems involving logarithms and exponents. (CCSS.MATH.CONTENT.HSF.BF.B.5) - For exponential models, express as a logarithm the solution to $ab^{ct} = d$ where a, c, and d are numbers and the base b is 2, 10, or e; evaluate the logarithm using technology. (CCSS.MATH.CONTENT.HSF.LE.A.4) - Interpret the parameters in a linear or exponential function in terms of a context. (CCSS.MATH.CONTENT.HSF.LE.B.5) - Make sense of problems and persevere in solving them. (CCSS.MATH.MP.1) - Reason abstractly and quantitatively. (CCSS.MATH.MP.2) - Model with mathematics. (CCSS.MATH.MP.4)	<i>Students will be able to independently use their learning to...</i> T1 manipulate equations/expressions or objects to create order and establish relationships. T2 demonstrate fluency with math facts, computation and concepts. T3 use appropriate tools to make reaching solutions more efficient, accessible and accurate. T4 model relationships among quantities.	
	Meaning	
	Understanding(s)	Essential Question(s)
	<i>Students will understand that...</i> U1 Mathematicians understand that placing a problem in a category gives one a familiar approach to solving it. U2 Mathematicians use numbers, ways of representing numbers, relationships among numbers, and number systems to build meaning. U3 Mathematicians examine the impact of operations and how they relate to one another. U4 Mathematicians represent and analyze mathematical situations and structures using algebraic symbols to communicate thinking.	<i>Students will keep considering...</i> Q1 What is the most efficient way to solve this problem? Q2 How can I simplify the problem? Q3 Have I used what I understand about numbers to make this easier? Q4 How do operations relate to one another? Q5 What is another way to represent this number?
	Acquisition of Knowledge and Skill	
	Knowledge	Skill(s)
	<i>Students will know...</i> K1 Radicals can be expressed as exponents K2 When to use logarithms K3 Logarithmic function is the inverse of an exponential function	<i>Students will be skilled at...</i> S1 simplifying expressions with radicals and exponents S2 converting between exponential and logarithmic equations

Stage 1: Desired Results - Key Understandings

- Look for and make use of structure. (CCSS.MATH.MP.7)

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- Analyzing: Examining information/data/ evidence from multiple sources to identify possible underlying assumptions, patterns, and relationships in order to make inferences. (POG.1.2)

K4 Vocabulary: Logarithm, Radical, Rational Exponent, argument, base

S3 applying the properties of logs to expand or condense expressions
S4 solving equations involving radicals and rational exponents (with and without logarithms)