Algebra II – Unit 5: Powers, Roots, and Radicals

Phoenixville Area School District

Stage 1 Desired Results

PA Core Standards:

CC.2.1.HS.F.1 Apply and extend the properties of exponents to solve problems with rational exponents.

CC.2.1.HS.F.2 Apply properties of rational and irrational numbers to solve real world or mathematical problems.

CC.2.1.HS.F.7 Apply concepts of complex numbers in polynomial identities and quadratic equations to solve problems.

CC.2.2.HS.D.8 Apply inverse operations to solve equations or formulas for a given variable.

CC.2.2.HS.C.2 Graph and analyze functions and use their properties to make connections between the different representations.

Transfer

TRANSFER GOALS

Students will be able to independently use their learning to…

- *Number Sense:* Develop a sound foundation to demonstrate the value of numbers by describing their various representations, relationships, and patterns.
- *Fluency:* Demonstrate automatic recall of addition, subtraction, multiplication, and division of rational numbers.
- *Problem-Solving:* Persistently apply various problem-solving strategies and organized approaches to accurately understand and solve problems and provide evidence to support response.
- *Reasoning:* Demonstrate mathematical resilience and conceptual understanding through the use of vocabulary, written expression, graphical representation, and alternate strategies.

Meaning

UNDERSTANDINGS

Students will understand that…

- Mathematical ideas interconnect and build on one another to produce a coherent whole.
- Various mathematical representations are useful for problem solving and communicating a solution.
- Tools and strategies are strategically selected and used to solve particular applications.
- Mathematical ideas must be communicated clearly in written, visual, or oral form.
- Algebraic rules and properties determine how expressions are simplified and how equations are solved.
- Patterns and functions can be generalized and represented using; verbal models, tables, equations, and graphs.

ESSENTIAL QUESTIONS

Students will keep considering...

- What is the question asking? How do I get there?
- What tools should I use here to be most efficient and effective?
- What counts as an adequate solution? Does my answer make sense?
- What does this quantity/number/ expression/value mean? What are the ways to represent it? Is there a best way?
- How do I create an equation/ representation that describes the problem situation? How do I know if I got it right? Is one representation more appropriate than another?

CC.2.2.HS.C.4 Interpret the effects transformations have on functions and find the inverses of functions. CC.2.2.HS.C.6 Interpret functions in terms of the situations they model.		
	Knowledge and Skills Acquisition	
	KNOWLEDGE *Students will know…* • How to simplify, add, subtract, multiply, and divide expressions using rational exponent properties • How to solve exponent and radical equations • How to add, subtract, multiply, divide, and compose functions and find these functions' domains and ranges • How to find, graph, transform, and analyze inverse functions VOCABULARY • Rational Exponent • Nth Root/Index • Composition Function • Inverse Function	SKILLS *Students will be skilled at…* • Simplifying, adding, subtracting, multiplying, and dividing expressions involving rational exponents through multiple choice and open response problems • Solving equations involving exponents and nth roots and explaining solutions in terms of the problem's context through open response problems • Finding a function's domain and range and adding, subtracting, multiplying, dividing, and composing functions through open response problems • Finding, graphing, transforming, and analyzing inverse functions through matching, open response, and constructed response problems

Stage 2 – Evidence			
Code A/M/T	**Evaluative Criteria**	**Assessment Evidence**	
A/M/T Acquisition Meaning Making Transfer	*What criteria will be used in each assessment to evaluate attainment of the desired results?*	PERFORMANCE TASK(S) *Students will demonstrate understanding (meaning making and transfer) through complex performance by...* **[Performance Assessment Title]** [Performance Assessment Description] • *Goal:* Your task is to... • *Role/Audience:* You are a... • *Situation/Product:* You will... • *Success Criteria:* Your [product] must include...	Differentiation Considerations:
A/M/T Acquisition Meaning Making Transfer	*What criteria will be used in each assessment to evaluate attainment of the desired results?*	OTHER EVIDENCE **[Unit Test]** • [Multiple Choice] • [True/False] • [Matching] • [Constructed Response Prompts:]	Differentiation Considerations: