Unit 10 - Radical Expressions and Equations

Content Area: **Mathematics**
Course(s): **Algebra I**
Time Period: **May**
Length: **12 days**
Status: **Published**

Unit Overview

This unit introduces concepts related to the square root opertion. This unit answers the questions: How are radical expressions represented? What are the characteristics of square root functions? How can you solve a radical equation?

Enduring Understandings

- Operations can be performed with radical expressions and radical expressions can be simplified using the multiplication and division properties of square roots.
- Some radical equations can be solved by squaring both sides and testing the solutions.
- Square root functions can be graphed by plotting points or using translations of the parent square root function.

Essential Questions

- How are radical expressions represented?
- How can you solve a radical equation?
- What are the characteristics of square root functions?

Standards/Indicators

MA.F-IF.C.7b	Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.
MA.A-CED.A.2	Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.
MA.G-SRT.C.6	Understand that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles.
MA.G-SRT.C.8	Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.
MA.A-REI.A.2	Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.

Student Learning Objectives (SLOs)

- Create linear equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.
- Sketch the graph of a function that models a relationship between two quantities (expressed symbolically or from a verbal description) showing key features (including intercepts, minimums/maximums, domain, and rate of change) by hand in simple cases and using technology in more complicated cases and relate the domain of the function to its graph

Lesson Titles

- Graphing Square Root Functions
- Operations with Radical Expressions
- Simplifying Radicals
- Solving Radical Expressions
- The Pythagorean Theorem

Career Readiness, Life Literacies & Key Skills

TECH.9.4.2.CI.1	Demonstrate openness to new ideas and perspectives (e.g., 1.1.2.CR1a, 2.1.2.EH.1, 6.1.2.CivicsCM.2).
TECH.9.4.2.CI.2	Demonstrate originality and inventiveness in work (e.g., 1.3A.2CR1a).
TECH.9.4.2.CT.2	Identify possible approaches and resources to execute a plan (e.g., 1.2.2.CR1b, 8.2.2.ED.3).
TECH.9.4.2.DC.1	Explain differences between ownership and sharing of information.
TECH.9.4.2.DC.2	Explain the importance of respecting digital content of others.
TECH.9.4.2.DC.3	Explain how to be safe online and follow safe practices when using the internet (e.g., 8.1.2.NI.3, 8.1.2.NI.4).
TECH.9.4.2.TL.2	Create a document using a word processing application.
TECH.9.4.2.TL.3	Enter information into a spreadsheet and sort the information.

Inter-Disciplinary Connections

LA.RL.11-12.4	Determine the meaning of words and phrases as they are used in the text, including figurative and connotative meanings; analyze the impact of specific word choices on meaning and tone, including words with multiple meanings or language that is particularly fresh, engaging, or beautiful. (e.g., Shakespeare as well as other authors.)
LA.W.9-10.2	Write informative/explanatory texts to examine and convey complex ideas, concepts, and information clearly and accurately through the effective selection, organization, and analysis of content.
LA.W.9-10.2.A	Introduce a topic; organize complex ideas, concepts, and information to make important connections and distinctions; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension.
LA.WHST.9-10.7	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.

LA.W.9-10.6	Use technology, including the Internet, to produce, share, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically.
LA.9-10.W.9-10.1	Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence. Introduce precise claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that establishes clear relationships among claim(s), counterclaims, reasons, and evidence.
9-12.HS-ETS1-4.5	Using Mathematics and Computational Thinking
9-12.HS-PS1-7.5	Mathematical and computational thinking at the 9–12 level builds on K–8 and progresses to using algebraic thinking and analysis, a range of linear and nonlinear functions including trigonometric functions, exponentials and logarithms, and computational tools for statistical analysis to analyze, represent, and model data. Simple computational simulations are created and used based on mathematical models of basic assumptions.

Instructional Strategies, Learning Activities, and Levels of Blooms/DOK

- students will work as a team and explain their work
- #1- Blooms Knowledge - Remember previously learned information
- #2 - Blooms Comprehension - Demonstrate an understanding of facts
- #3 - Blooms Application - Apply Knowledge to actual situations
- #4 - Blooms Analysis - Break down objects or ideas into simpler parts and find evidence to support generalizations
- #5 - Blooms Synthesis - Compile component ideas into a new whole or propose alternative solutions
- #6 - Blooms Evaluation - Make and defend judgments based on internal evidence or external criteria
- review homework if need - answers posted on Edmodo
- review warm up
- students will work individually
- tutoring during Delsea One

Benchmark Assessment

Skills-based assessment- math practice

Alternate Assessments

Performance tasks

Project-based assignments

Problem-based assignments

Presentations

Modifications

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ELL Modifications

- Assess ELL students continuously using formative assessment methods
- Acquire the help from the Foreign Language Department if possible
- Be flexible with time frames and deadlines
- During Delsea One - one on one with a student who speaks the same language
- Intentional scheduling/grouping with student/teacher who speaks the same language if possible
- Khan Academy offers lesson in several languages: https://es.khanacademy.org/
- Offer resources for specific topics in primary language (Youtube web resources)
- Repeat, reword, clarify
- The NEA Portal offers lessons in several languages: http://neaportal.k12.ar.us/index.php/algebra-1-en-espanol/
- tutoring during Delsea One
- Use google translator, especially for application problems
- Using technology, such as but not limited to: graphing calculator and desmos

IEP & 504 Modifications

- Allow re-takes only after a tutoring session
- Assessments will allow for calculator use and/or other math tools
- Higher level reasoning questions would have less weight than other questions or provide as extra credit questions to provide exposure to these questions but not something that will be a determinant to the student's ability to share knowledge of content
- if not in a co-teaching setting allowing time in the schedule for a special education teacher to consult with general education teachers on what specifically can be modified or how to paraphrase things in a different way specific to that lesson
- Keep updated videos on google classroom for reinforcement outside of the classroom
- Less questions overall or possibly break the test into two parts
- Modeling and showing several examples
- speaking to students privately when redirecting behaviors

- tutoring during Delsea One
- Upload several youtubes on the concepts that are in this specific unit

G&T Modifications

- Ask students' higher level questions that require students to look into causes, experiences, and facts to draw a conclusion or make connections to other areas of learning
- Employ differentiated curriculum to keep interest high
- Encourage students to make transformations- use a common task or item in a different way
- Flip the lessons to push further ahead
- Flip the lessons using videos of more in depth work
- Include more in depth problems involving application
- Provide more rigorous problems; either off the NJ State website or from the Pearson Algebra 2 textbook (available on mathxl)
- tutoring during Delsea One
- Videos that offer extra practice and examples in all areas are posted on google classroom and taken from: mathispower4u

At Risk Modifications

- Refer students to Organizational Management
- Require Delsea One tutoring
- Stay in contact with parents/guardians and guidance counselors on student progress
- tutoring during Delsea One

Formative Assessment

- connecting previous lessons
- connecting vocabulary with root words
- evaluate your understanding of the lesson
- Guided Review
- homework/classwork
- Mathxlforschool
- NJSLA Math type of question
- Pass Out of Class
- Pass out of class
- SAT question of the day
- Skill need to do lesson
- teacher observation
- think-pair-share

- Warm up Review
- White Boards

Summative Assessment

- Quiz on Operations with Radical Expressions
- Quiz on Pythagorean Theorem
- Quiz on Simplifying Radicals
- Quiz on Solving Radical Equations

Resources & Materials

- colored pencils/highlighters
- Google slides
- Mathispower4u video clip to introduce or demonstrate concepts
- Pearson 2015 Algebra 1 Textbook
- Teacher generated worksheets
- white board paddles

Technology

- Chromebooks
- Desmos
- Edpuzzle
- Equatio
- Google Classroom
- Google Forms
- Graphing calculator
- mathway
- Mathxlforschool
- PearDeck
- Remind
- Video clips

TECH.8.1.12	Educational Technology: All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.
TECH.8.1.12.A.4	Construct a spreadsheet workbook with multiple worksheets, rename tabs to reflect the data on the worksheet, and use mathematical or logical functions, charts and data from all worksheets to convey the results.
TECH.8.1.12.A.CS1	Understand and use technology systems.

TECH.8.1.12.A.CS2	Select and use applications effectively and productively.