

Unit 7 : Radical Expressions

Content Area: **Math**
Course(s): **Algebra 1**
Time Period: **MayJun**
Length: **3 weeks**
Status: **Published**

Title Section

Department of Curriculum and Instruction



Belleville Public Schools

Curriculum Guide

Algebra 1 A

Unit 7: Radical Expressions

Belleville Board of Education

102 Passaic Avenue

Belleville, NJ 07109

Prepared by: Annamaria Contella, Tataina Ryjouk

Dr. Richard Tomko, Ph.D., M.J., Superintendent of Schools
Dr. Giovanni Cusmano, Director of Elementary Education K - 8
Mr. George Droste, Director of Secondary Education

Board Approved: August 27th, 2018

Unit Overview

- This unit is about simplifying radical expressions, operations with radical expressions and solving problems using the Pythagorean Theorem.
- The students should learn how to simplify radicals, perform operations with radicals and apply the Pythagorean Theorem to solve problems.

NJSLS

MA.9-12.F-IF.B.4	For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship.
MA.9-12.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.9-12.A-REI.B.4a	Use the method of completing the square to transform any quadratic equation in x into an equation of the form $(x - p)^2 = q$ that has the same solutions. Derive the quadratic formula from this form.
MA.9-12.G-SRT.C.8	Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.
MA.9-12.F-IF.C.7b	Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.
MA.9-12.N-RN.A.2	Rewrite expressions involving radicals and rational exponents using the properties of exponents.

Exit Skills

By the end of Unit 7 Students Should be able to:

- Simplifying radical expressions.
- Perform operations with radical expressions.
- Simplify radical expressions by using the Product Property

- Simplify radical expressions by using the Quotient Property of square roots.
- Master the solution of linear equations and apply related solution techniques and the laws of exponents to the creation and solution of simple exponential equations.
- Add, subtract, and multiply radical expressions.
- Extend the laws of exponents to rational exponents involving square and cube roots and apply this new understanding of number.
- Create quadratic and exponential expressions.
- Apply The Pythagorean Theorem to find unknown sides and distances.
- Solve problems by using the Pythagorean Theorem.
- Determine whether a triangle is a right triangle.

Enduring Understanding

- Find the length/distance in the variety of the real-world problems.
- Make sense of problems and persevere in solving them.
- Reason abstractly and quantitatively.
- Construct viable arguments and critique the reasoning of others.
- Model with mathematics.
- Attend to precision.
- Look for and make use of structure.
- Look for and express regularity in repeated reasoning.

Essential Questions

- How are radical expressions represented?
- How can simplify radicals?
- How do you add radicals?
- How do you multiply radicals?
- What properties of real numbers do you use to perform operations with radicals?
- What relationship do the sides in a right triangle have?
- How can you find the length of the unknown side in a right triangle?

Learning Objectives

Students will be able to:

- Simplify radical expressions by using the Product property of square roots.
- Simplify radical expressions by using the Quotient property of square roots.
- Simplify radical expressions by using the Zero property of square roots.

- Perform operations with radical expressions by using a varieties of properties.
- Create a graphic organizer to compare and identify different properties with radicals.
- Add, subtract, and multiply radical expressions.
- Justify the steps in simplifying radicals using different properties.
- Apply The Pythagorean Theorem to find unknown sides and distances.
- Plan the steps in solving the real-world applications involving the Pythagorean Theorem.
- Conclude whether a triangle is a right triangle by checking the outcomes of the Pythagorean Theorem

Interdisciplinary Connections

Economics, business, financing, geometry, literacy, science.

CRP.K-12.CRP2	Apply appropriate academic and technical skills.
CRP.K-12.CRP4	Communicate clearly and effectively and with reason.
CRP.K-12.CRP11	Use technology to enhance productivity.
CRP.K-12.CRP8	Utilize critical thinking to make sense of problems and persevere in solving them.
CRP.K-12.CRP7	Employ valid and reliable research strategies.
TECH.8.1.12.A.3	Collaborate in online courses, learning communities, social networks or virtual worlds to discuss a resolution to a problem or issue.
TECH.8.1.12.F.1	Evaluate the strengths and limitations of emerging technologies and their impact on educational, career, personal and or social needs.

Alignment to 21st Century Skills & Technology

Key SUBJECTS AND 21st CENTURY THEMES

Mastery of key subjects and 21st century themes is essential for all students in the 21st century.

Key subjects include:

- English, reading or language arts
- World languages
- Arts
- Mathematics
- Economics
- Science
- Geography
- History
- Government and Civics

21st Century/Interdisciplinary Themes

- Financial, Economic, Business and Entrepreneurial Literacy
- Global Awareness

21st Century Skills

- Communication and Collaboration
- Creativity and Innovation
- Critical thinking and Problem Solving
- ICT (Information, Communications and Technology) Literacy
- Information Literacy
- Life and Career Skills

Suggested Activities & Best Practices

Textbook, eAssessment, supplemental materials:

<https://my.mheducation.com/login>

AI Assessment and Learning System:

<https://www.aleks.com/>

Mindset:

<https://www.youtube.com/watch?v=3icoSeGqQtY>

<http://www.youcubed.org/wp-content/uploads/Positive-Classroom-Norms2.pdf>

Teaching Strategies for Improving Algebra Knowledge in Middle and High School Students:

<https://ies.ed.gov/ncee/wwc/PracticeGuide/20>

Coaching Corner:

<https://sites.google.com/belleville.k12.nj.us/thecoachingcorner/home>

Algebra Tools - Functions:

<https://www.state.nj.us/education/aps/cccs/math/NJISTFunctions.pdf>

Algebra Tools - Algebra:

<https://www.state.nj.us/education/aps/cccs/math/NJISTAlgebra.pdf>

Misc Mathematics materials:

<http://www.mathnstuff.com/>

Algebra Kahoots:

<https://kahoot.com/explore/collections/math-kahoot-algebra/>

Radical Pracrice

<https://quizlet.com/260485139/radicals-flash-cards/>

Various Radical practice

http://www.mdc.edu/main/images/Radical%20Expressions_tcm6-60836.PDF

<https://whenmathhappens.com/2018/08/14/concept-quiz-simplifying-radicals/>

Technology Infusion

- Youtube
- Khan academy
- MS Excel
- Office 365
- MS Word
- PodCasts
- MS Powerpoint
- Wikipedia
- Skype
- Twitter
- Ted Talks
- QR Barcode Generator
- Calculator/Graphic calculator

Differentiation

- Cooperative groups
- Board work
- Team work
- Classroom discussions
- Questions and Answers
- Study guide
- Tets/quizzes reviews
- Notes taking/transparencies
- Organizer

- Calculator/graphic calculator
- Posters display
- Extra time

Special Education

- printed copy of board work/notes provided
- additional time for skill mastery
- assistive technology
- behavior management plan
- Center-Based Instruction
- check work frequently for understanding
- computer or electronic device utilizes
- extended time on tests/ quizzes
- have student repeat directions to check for understanding
- highlighted text visual presentation
- modified assignment format
- modified test content
- modified test format
- modified test length
- multiple test sessions
- multi-sensory presentation
- preferential seating
- preview of content, concepts, and vocabulary
- reduced/shortened reading assignments
- Reduced/shortened written assignments
- secure attention before giving instruction/directions
- shortened assignments
- student working with an assigned partner
- teacher initiated weekly assignment sheet
- Use open book, study guides, test prototypes

ELL

- teaching key aspects of a topic. Eliminate nonessential information
- using videos, illustrations, pictures, and drawings to explain or clarify
- allowing products (projects, timelines, demonstrations, models, drawings, dioramas, poster boards, charts, graphs, slide shows, videos, etc.) to demonstrate student's learning;

- allowing students to correct errors (looking for understanding)
- allowing the use of note cards or open-book during testing
- decreasing the amount of work presented or required
- having peers take notes or providing a copy of the teacher's notes
- modifying tests to reflect selected objectives
- providing study guides
- reducing or omitting lengthy outside reading assignments
- reducing the number of answer choices on a multiple choice test
- tutoring by peers
- using computer word processing spell check and grammar check features
- using true/false, matching, or fill in the blank tests in lieu of essay tests

Intervention Strategies

- allowing students to correct errors (looking for understanding)
- teaching key aspects of a topic. Eliminate nonessential information
- allowing products (projects, timelines, demonstrations, models, drawings, dioramas, poster boards, charts, graphs, slide shows, videos, etc.) to demonstrate student's learning
- allowing students to select from given choices
- allowing the use of note cards or open-book during testing
- collaborating (general education teacher and specialist) to modify vocabulary, omit or modify items to reflect objectives for the student, eliminate sections of the test, and determine how the grade will be determined prior to giving the test.
- decreasing the amount of work presented or required
- having peers take notes or providing a copy of the teacher's notes
- marking students' correct and acceptable work, not the mistakes
- modifying tests to reflect selected objectives
- providing study guides
- reducing the number of answer choices on a multiple choice test
- tutoring by peers
- using authentic assessments with real-life problem-solving
- using videos, illustrations, pictures, and drawings to explain or clarify

Evidence of Student Learning-CFU's

Please list ways educators may effectively check for understanding in this section.

- Anticipation Guide
- Common benchmarks
- Compare & Contrast
- Define

- Describe
- Evaluate
- Evaluation rubrics
- Exit Tickets
- Explaining
- Illustration
- KWL Chart
- Outline
- Question Stems
- Quizzes
- Self- assessments
- Socratic Seminar
- Study Guide
- Teacher Observation Checklist
- Think, Pair, Share
- Top 10 List
- Unit tests

Primary Resources

Glencoe McGraw-Hill Algebra1 2014

Glencoe McGraw-Hill Algebra1 2010

Practice Glencoe Algebra1

Study Guide Glencoe Algebra1

Ancillary Resources

Houghton Mifflin Harcourt On core Mathematics Algebra1

Glencoe McGraw-Hill Science and Mathematics Lab Manual

