Unit 7: Radical Functions, Expressions and Equations

Content Area: **Math**
Course(s):
Time Period:
Length: **7 classes (CP) 6 classes (Honors)**
Status: **Published**

State Mandated Topics Addressed in this Unit

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N/A	N/A

Radical Functions, Expressions and Equations

Learning Objectives

- Objective 1 - Explain the definition of rational exponents.
- Objective 10 - Apply scales to multi-step problems and formulas.
- Objective 11 - Interpret units in formulas.
- Objective 12 - Choose units in formulas.
- Objective 13 - Choose limits on measurements when reporting quantities.
- Objective 14 - Choose the level of accuracy.
- Objective 15 - Know the definition of the complex number, i.
- Objective 16 - Know the form a+bi
- Objective 17 - Solve simple rational and radical equations.
- Objective 18 - Identify extraneous solutions.
- Objective 19 - Sketch a graph using the key features of a function.
- Objective 2 - Explain the properties of integer exponents.
- Objective 20 - Interpret key features from a graph or a table of values.
- Objective 21 - Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.
- Objective 22 - Relate the domain of a function its graph.
- Objective 23 - Relate the domain of a function to the quantitative relationship that it describes.
- Objective 24 - Graph square roots, cube root, absolute value, and piecewise functions showing key features of the graph.
- Objective 25 - Key features include intercepts and extrema.
- Objective 3 - Apply laws of exponents to values.
- Objective 4 - Explain notation for radicals.

- Objective 5 - Convert between radicals and rational exponents.
- Objective 6 - Rewrite using properties of exponents.
- Objective 7 - Simplify radicals, including algebraic radicals.
- Objective 8 - Apply scales to graphs, origin of graph and data displays.
- Objective 9 - Use units to make sense of solutions.

Essential Skills

- Essential Skill 1 - The artist will be able to explain the definition of rational exponents.
- Essential Skill 10 - The artist will be able to apply scales to multi-step problems and formulas.
- Essential Skill 11 - The artist will be able to interpret units in formulas.
- Essential Skill 12 - The artist will be able to choose units in formulas.
- Essential Skill 13 - The artist will be able to choose limits on measurements when reporting quantities.
- Essential Skill 14 - The artist will be able to choose the level of accuracy.
- Essential Skill 15 - The artist will know the definition of the complex number, i.
- Essential Skill 16 - The artist will know the form a+bi
- Essential Skill 17 - The artist will be able to solve simple rational and radical equations.
- Essential Skill 18 - The artist will be able to identify extraneous solutions.
- Essential Skill 19 - The artist will be able to sketch a graph using the key features of a function.
- Essential Skill 2 - The artist will be able to explain the properties of integer exponents.
- Essential Skill 20 - The artist will be able to interpret key features from a graph or a table of values. Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.
- Essential Skill 21 - The artist will be able to relate the domain of a function its graph.
- Essential Skill 22 - The artist will be able to relate the domain of a function to the quantitative relationship that it describes.
- Essential Skill 23 - The artist will be able to graph square roots, cube root, absolute value, and piecewise functions showing key features of the graph. Key features include intercepts and extrema.
- Essential Skill 3 - The artist will be able to apply laws of exponents to values.
- Essential Skill 4 - The artist will be able to explain notation for radicals.
- Essential Skill 5 - The artist will be able to convert between radicals and rational exponents.
- Essential Skill 6 - The artist will be able to rewrite using properties of exponents.
- Essential Skill 7 - The artist will be able to simplify radicals, including algebraic radicals.
- Essential Skill 8 - The artist will be able to apply scales to graphs, origin of graph and data displays.
- Essential Skill 9 - The artist will be able to use units to make sense of solutions.

Standards

MATH.9-12.N.RN.A.1	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.

MATH.9-12.N.RN.A.2	Rewrite expressions involving radicals and rational exponents using the properties of exponents.
MATH.9-12.N.RN.A.3	Simplify radicals, including algebraic radicals (e.g., $\sqrt[3]{54} = 3\sqrt[3]{2}$, simplify $\sqrt{32x^2}$).
MATH.9-12.N.Q.A.1	Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.
MATH.9-12.N.Q.A.3	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.
MATH.9-12.N.CN.A.1	Know there is a complex number i such that $i^2 = -1$, and every complex number has the form $a + bi$ with a and b real.
MATH.9-12.A.REI.A.2	Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.
MATH.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.
MATH.9-12.F.IF.B.5	Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.
MATH.9-12.F.IF.C.7.b	Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.

Instructional Tasks/Activities

- Academic games & Competitions
- Arts inspired projects
- Formative Assessments
- Ladder Activity
- Notes
- Worksheets

Assessment Procedure

- Classroom Total Participation Technique
- Classwork
- DBQ
- Essay
- Exit Ticket/Entrance Ticket/Do Now
- Journal / Student Reflection
- Kahoot
- Other named in lesson
- Peer Review
- Performance
- Problem Correction

- Project
- Quiz
- Rubric
- Teacher Collected Data
- Test
- Worksheet

Recommended Technology Activities

- Appropriate Content Specific Online Resource
- Chromebook
- Gimkit
- GoGuardian
- Google Classroom
- Google Docs
- Google Forms
- Google Slides
- Kahoot
- MagicSchool AI
- Other- Specified in Lesson
- Power Point
- Quizizz
- Screencastify

Accommodations & Modifications & Differentiation

Accommodations and Modifications should be used to meet individual needs. Their IEP and 504 plans should be used in addition to the following suggestions.

Gifted and Talented

- Compare & Contrast
- Conferencing
- Debates
- Jigsaw
- Peer Partner Learning
- Problem Solving
- Structured Controversy

- Think, Pair, Share
- Tutorial Groups

Instruction/Materials

- alter format of materials (type/highlight, etc.)
- color code materials
- eliminate answers
- extended time
- large print
- modified quiz
- modified test
- Modify Assignments as Needed
- Modify/Repeat/Model directions
- necessary assignments only
- Other (specify in plans)
- other- named in lesson
- provide assistance and cues for transitions
- provide daily assignment list
- read class materials orally
- reduce work load
- shorten assignments
- study guide/outline
- utilize multi-sensory modes to reinforce instruction

Environment

- alter physical room environment
- assign peer tutors/work buddies/note takers
- assign preferential seating
- individualized instruction/small group
- modify student schedule (Describe)
- other- please specify in plans
- provide desktop list/formula

Honors Modifications

The honors track will move at a faster pace for this unit. They will have more in depth critical thinking and anal will also be able to solve higher power equations by using the reciprocal of the exponent.

Resources

- https://njctl.org/courses/math/algebra-ii/