Marietta City Schools

2024–2025 District Unit Planner

Algebra: Concepts & Connections

Unit title	Unit 3: Investigating Rational and Irrational Numbers	**MYP year**	4	**Unit duration (hrs)**	*7.5 hrs*

Mastering Content and Skills through INQUIRY (Establishing the purpose of the Unit): ***What will students learn?***

GA DoE Standards

Standards

A.NR.5: Investigate rational and irrational numbers and rewrite expressions involving square roots and cube roots.

A.NR.5.1 Rewrite algebraic and numeric expressions involving radicals.

Relevance and Application

• Students should be able to use the operations of addition, subtraction, and multiplication, with radicals within expressions limited to square roots and cube roots.

A.NR.5.2 Using numerical reasoning, show and explain that the sum or product of rational numbers is rational, the sum of a rational number and an irrational number is irrational, and the product of a nonzero rational number and an irrational number is irrational.

Fundamentals

• The tasks selected should aid students with their development of a conceptual understanding of the sums and products of rational and irrational numbers through exploration and investigation.

• Students should be able to judge the reasonableness of an answer based on their understanding of rational and irrational numbers.

Examples

• Students should know that adding two irrational numbers, such as $3\sqrt{5}$ and $\sqrt{7}$, may result in an irrational number.

• The side length of a square is$\sqrt{8}$. Is the perimeter a rational or irrational number?

A.MM.1: Apply mathematics to real-life situations; model real-life phenomena using mathematics

A.MM.1.3 Use units of measure (linear, area, capacity, rates, and time) as a way to make sense of conceptual problems; identify, use, and record appropriate units of measure within the given framework, within data displays, and on graphs; convert units and rates using proportional reasoning given a conversion factor; use units within multi-step problems and formulas; interpret units of input and resulting units of output.

Strategies and Methods

• Dimensional analysis may be used when converting units and rates.

Examples

• Units of measure may include linear, area, capacity, rates, and time.

A.MM.1.4 Use various mathematical representations and structures with this information to represent and solve real-life problems.

Strategies and Methods

• Students should be able to fluently navigate between mathematical representations that are presented numerically, algebraically, and graphically.

• For graphical representations, students should be given opportunities to analyze graphs using interactive graphing technologies.

A.MM.1.5 Define appropriate quantities for the purpose of descriptive modeling.

Fundamentals

• Given a situation, framework, or problem, students should be able to determine, identify, and use appropriate quantities for representing the situation.

Concepts/Skills to support mastery of standards

Students will identify perfect squares and perfect cubes.
Students will perform and simplify operations with radical expressions, both square root and cubed root.
Students will investigate sums and products of rational and irrational numbers.
Students will investigate how square roots and cubed roots are used when finding perimeter, area, and volume of figures.

Vocabulary

Composite Number	Cube Root	Factor	Fractions	Index	Integers
Irrational Number	Natural Numbers	Non-repeating Decimal	Non-terminating Decimal	Operation	Perfect squares
Prime Number	Power	Radical Sign	Radicand	Ratio	Rational Number
Real Numbers	Repeating Decimals	Root	Square	Square Root	Terminating Decimal
Whole Numbers	Zero	Radical Expression			

Notation

Square Root - $\sqrt{x}$ Cubed Root - $\sqrt[3]{x}$ Nth Root - $\sqrt[n]{x}$

Key concept	Related concept(s)	Global context
Relationship Identify and understand connections and associations between properties, objects, people, and ideas - including the human community's connections with the world in which we live.	Equivalence, Models	Scientific and Technical Innovation - Modernization, industrialization and engineering
Statement of inquiry		

Exploring the relationships between rational and irrational numbers through models can enhance our understanding of their properties and applications in scientific and technical innovation

Inquiry questions

Factual—

- What is a cubed root?
- What is a rational number?
- What is an irrational number?
- What are the operations that can be used with square roots and cube roots within expressions?

Conceptual—

- In what ways can models be used to represent and explore the relationships between rational and irrational numbers?
- How do the concepts of patterns and systems relate to the properties and relationships of rational and irrational numbers?

Debatable-

- What is the most efficient method for simplifying expressions involving radical expressions?

MYP Objectives	**Assessment Tasks**	
*What specific MYP **objectives** will be addressed during this unit?*	***Relationship** between summative assessment task(s) and statement of inquiry:*	*List of common formative and summative assessments.*
MYP C - Evaluating Statements about Irrational and Rational Numbers (modified)	Summative will have properties of rational and irrational numbers in which students delineate between the two models.	**Formative Assessment(s):** MYP C **Summative Assessment(s):** Unit 3 Assessment

Approaches to learning (ATL)

Category: Self-Management Skills
Cluster: Reflection

Skill Indicator: Perseverance - demonstrate persistence and perseverance
Learning Activity: Equivalent Radical Expressions

Learning Experiences Add additional rows below as needed.		
Objective or Content	**Learning Experiences**	**Personalized Learning and Differentiation**
A.NR.5.1 Rewrite algebraic and numeric expressions involving radicals.	**Equivalent Radical Expressions: Length and Perimeter** **Description:** In this learning plan, students will use their prior knowledge to identify and calculate equivalent radical expressions. Students will use radicals to solve problems involving length and perimeter of objects. This learning plan focuses on square roots. **Learning Goals:** ● I can determine equivalent radical expressions. ● I can add and subtract radical expressions.	
A.NR.5.1 Rewrite algebraic and numeric expressions involving radicals.	**Equivalent Radical Expressions: Length and Area (Apply Problem - Optional)** **Description:** In this learning plan, students will use their prior knowledge to identify and calculate equivalent radical expressions. Students will apply their understanding of operations w/radical expressions to solve problems involving length and area. This learning plan focuses on square roots. **Learning Goals:** ● I can determine equivalent radical expressions. ● I can multiply radical expressions.	
Content Resources		
Textbook Correlation: enVision A|G|A - Algebra 1 **A.NR.5.1** - Lesson 1-1, 9-3, 9-4 **A.NR.5.2** - Lesson 1-1		