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| **Grade Level**  9th Foundation of Algebra | | **Teacher/Room**: LPAYNE – BTIPPENS 181 Week of: 2/29- 3/4 | | | |
| **Unit Vocabulary:** Arithmetic to Algebra- SEE ATTACHED | | | | | |
| **Instructional Strategies Used:** direct instruction, independent study, interactive instruction | | | | | |
| **Day 1** | **Day 2** | | **Day 3** | **Day 4** | **Day 5** |
| **Common Core Standard(s)**:  **MFAAA1**  **MFAAA2** | **Common Core Standard(s)**:  **MFAAA1**  **MFAAA2** | | **Common Core Standard(s)**:  **MFAAA1**  **MFAAA2** | **Common Core Standard(s)**:  **MFAAA1**  **MFAAA2** | **Common Core Standard(s)**:  **MFAAA1**  **MFAAA2** |
| **EQ Question:**  1.How can I evaluate formulas at specific values for the variables contained within the formulas?  2.How can I interpret and use the properties of exponents in numerical expressions? | **EQ Question:**  1.How can I combine algebraic expressions using addition, subtraction, and multiplication?  2.How can I translate verbal expressions into mathematical expressions given various contexts? | | **EQ Question:**  1.How can I use the symbols for cube and square roots to represent solutions to cube or square root equations?  2.How can I apply the Pythagorean Theorem to find the hypotenuse of a right triangle given the two legs? | **EQ Question:**  1.How can I use the symbols for cube and square roots to represent solutions to cube or square root equations?  2.How can I apply the Pythagorean Theorem to find the hypotenuse of a right triangle given the two legs? | **EQ Question:**  1.How can I use the symbols for cube and square roots to represent solutions to cube or square root equations?  2.How can I apply the Pythagorean Theorem to find the hypotenuse of a right triangle given the two legs? |
| **Mini Lesson:**  Number talk  **Activating Strategies:**  **Check homework**  **Lesson::** CONJECTURES ABOUT PROPERTIES  Extending Arithmetic to Algebra Evaluating expressions  Evaluating formulas  Order of operations and Using exponents  **Resource/Materials:**  Task and examples | **Mini Lesson:**  Number talk  **Activating Strategies:**  Check homework  **Lesson:**  Combining like terms  Translating verbal expressions into mathematical expressions  Exploring Expressions task  **Resource/Materials:**  Task and examples | | **Mini Lesson:**  Number talk  **Activating Strategies:**  **Check homework**  **Lesson:**  Find solutions to square root and cube root equations  Use the Pythagorean theorem to find the missing side of a triangle  **Resource/Materials:**  Task and examples | **Mini Lesson:**  Number talk  **Activating Strategies:**  **Check homework**  **Lesson:** A Few Folds task  Find solutions to square root and cube root equations  Bacterial Growth task  Use the Pythagorean theorem to find the missing side of a triangle  **Resource/Materials:**  Task and examples | **Mini Lesson:**  Number talk  **Activating Strategies:**  **Check homework**  **Lesson:**  Find solutions to square root and cube root equations  Squares, Area, Cubes, Volume, Roots….Connected?  Use the Pythagorean theorem to find the missing side of a triangle  **Resource/Materials:**  Task and examples |
| **Differentiation: usatestprep**  *Content/Process/Product:*  *Grouping Strategy:pre/post test*  *Assessment:Weekly test* | **Differentiation:usatestprep**  *Content/Process/Product:*  *Grouping Strategy: pre/post test*  *Assessment weekly test* | | **Differentiation:usatestprep**  *Content/Process/Product:*  *Grouping Strategy: pre/post test*  *Assessment weekly test* | **Differentiation:usatestprep**  *Content/Process/Product:*  *Grouping Strategy: pre/post test*  *Assessment weekly test* | **Differentiation:**  *Content/Process/Product:*  *Grouping Strategy:*  *Assessment weekly test* |
| **Homework:**  Pg. 90, 97 | **Homework:**  **Pg. 128, 131, 133, 139, 142, 145** | | **Homework:** | **Homework:**  Pg. 147, 150,153,160,164,167,170 | **Homework:**  **177-185** |
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Resources and Reflective Notes:

**ESSENTIAL QUESTIONS- Monday**

 How can I tell if a group of equations satisfies a property? (Commutative, Associative, Identity, Zero Property of Multiplication, and Distributive)

 How are properties of numbers helpful in computation?

**ESSENTIAL QUESTIONS Tuesday**

 How can you determine which mathematical operation to apply?

 How can you model and interpret mathematical expressions?

**FORMATIVE ASSESSMENT QUESTIONS Tuesday**

The following questions are suggestions to gauge student understanding of mathematical translations. There are many others that teachers could establish to assess understanding.

 How can you explain your model?

 How can you convince me your method is correct?

 How did you decide which math operation to use?

 How could you solve this problem another way?

**DIFFERENTIATION IDEAS Tuesday**

Students who struggle with translating words into symbols could be provided options at the onset of the lesson to help them better understand the problem. As students become more proficient, these options can be removed.

Students who need more challenge could be asked to devise their own problems involving one or more operations. They could then exchange problems with others. Students could also be given a bar model (tape diagram) and be asked to create a problem that could be modeled by the diagram. Students could then exchange problems to see if classmates draw a model aligned to the one provided originally.

**ESSENTIAL QUESTIONS –Thursday**

 When are exponents used and why are they important?

 How do I simplify and evaluate numeric expressions involving integer exponents?

 When are exponents used and why are they important?

 How do I simplify and evaluate numeric expressions involving integer exponents?

 How can you multiply exponential expressions with a common base?

 How can you represent exponential expressions in multiple ways?

 How can you divide exponential expressions with a common base?

**Intervention/Scaffolding:**

Part 1: Set up the table for the students to mark their observations. Discuss the first fold as a class and how to mark that on the table.

Part 2: Remind students of liquid measurement conversions, perhaps by providing a reference chart. Remind students that these patterns are easier to see when noted in tables. Some students would benefit from actual containers of appropriate size to experience the relationship between the measurements. Instead of providing students with the conversion factors, actually fill a measuring cup to show the number of cups in a pint, quart, and gallon.

For the money example, you could bring in the actual coins to model the equivalent values.

**DIFFERENTIATION**

**Intervention: Thursday**

Students may struggle to put their explanation for part (h) together. The teacher might want to have the students do parts (1) - (7) as a precursor to providing an explanation like the one given in the solution for part (8).

**CLOSING**

Choose one of today’s essential questions and provide a written answer. Provide at least one example with your explanation.

**ESSENTIAL QUESTIONS**

 How can I apply properties of operations to generate equivalent expressions?

 How can I use the area model to represent the distributive property?

 How can I combine algebraic expressions using addition, subtraction, and multiplication?

 How can I translate verbal expressions into mathematical expressions given various contexts?

 How can I evaluate formulas at specific values for the variables contained within the formulas?

 How can I interpret and use the properties of exponents in numerical expressions?

 How can I use the symbols for cube and square roots to represent solutions to cube or square root equations?

 How can I apply the Pythagorean Theorem to find the hypotenuse of a right triangle given the two legs?

MODULE 2 VOCABULARY - Arithmetic to Algebra

Equivalent expressions

Distributive property

Algebraic expression

Numeric expression

Area Model

Commutative Property

Associative Property

Identity Properties

Inverse Operations

Variable

Formula

Square Number

Square Root

Pythagorean Theorem

Hypotenuse

Cubic Number

Cube Root

Rational Number

Irrational Number

Exponent

**STANDARDS FOR MATHEMATICAL CONTENT**

**Students will extend arithmetic operations to algebraic modeling.**

**MFAAA1. Students will generate and interpret equivalent numeric and algebraic expressions.**

a. Apply properties of operations emphasizing when the commutative property applies. (MGSE7.EE.1)

b. Use area models to represent the distributive property and develop understandings of addition and multiplication (all positive rational numbers should be included in the models). (MGSE3.MD.7)

c. Model numerical expressions (arrays) leading to the modeling of algebraic expressions. (MGSE7.EE.1,2; MGSE9-12.A.SSE.1,3)

d. Add, subtract, and multiply algebraic expressions. (MGSE6.EE.3, MGSE6.EE.4, MC7.EE.1, MGSE9-12.A.SSE.3)

e. Generate equivalent expressions using properties of operations and understand various representations within context. For example, distinguish multiplicative comparison from additive comparison. Students should be able to explain the difference between “3 more” and “3 times”. (MGSE4.0A.2; MGSE6.EE.3, MGSE7.EE.1, 2, MGSE9-12.A.SSE.3)

f. Evaluate formulas at specific values for variables. For example, use formulas such as

A = l x w and find the area given the values for the length and width. (MGSE6.EE.2)

**MFAAA2. Students will interpret and use the properties of exponents.**

a. Substitute numeric values into formulas containing exponents, interpreting units consistently. (MGSE6.EE.2, MGSE9-12.N.Q.1, MGSE9-12.A.SSE.1, MGSE9-12.N.RN.2)

b. Use properties of integer exponents to find equivalent numerical expressions. For example, 32 𝑥 3−5=3−3=133=127. (MGSE8.EE.1)

c. Evaluate square roots of perfect squares and cube roots of perfect cubes (MGSE8.EE.2)

d. Use square root and cube root symbols to represent solutions to equations of the form 𝑥2=𝑝 and 𝑥3=𝑝, where p is a positive rational number. (MGSE8.EE.2)

e. Use the Pythagorean Theorem to solve triangles based on real-world contexts (Limit to finding the hypotenuse given two legs). (MGSE8.G.7)