



Unit 2 Expressions, Equations and Inequalities MS Advanced 1

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Archdiocesan Curriculum > MS Advanced 1 > Math > Length of unit 30 to 3.5 days

Stage 1: Desired Results						
General Information In this unit, students will expand their understanding of expressions, equations, and inequalities. They will begin by working with exponents and writing, interpreting, and evaluating numerical and algebraic expressions, using key properties and identifying like terms to generate equivalent expressions. Students will add, subtract, and factor linear expressions with rational coefficients and represent real-world situations algebraically. Building on this foundation, students will write and solve one-step equations involving all four operations, including those with negative integers, fractions, and decimals, and use properties of equality to justify their steps. They will also write and graph inequalities to model constraints and real-world problems. Finally, students will represent equations using tables and graphs, identify independent and dependent variables, and write equations from verbal descriptions or data displays, making connections between multiple representations of relationships. Mathematical Practices - MP1 – Make sense of problems and persevere in solving them - MP2 – Reason abstractly and quantitatively - MP4 – Model with mathematics - MP7 – Look for and make use of structure	Essential Question(s) - How can numbers, symbols, and variables be used to represent relationships, patterns, and real-world situations? - What do expressions and equations tell us, and how can we use them to solve problems and make predictions? - How do properties of operations help us simplify and compare expressions or solve equations efficiently? - What is the difference between an expression, an equation, and an inequality, and how can each be represented and interpreted? - How can tables and graphs help us visualize and describe the relationship between two variables in a real-world context?					
	Enduring Understanding/Knowledge Students will: - Write and find the value of expressions involving exponents. - Write and evaluate numerical expressions. - Write an algebraic expression to represent a situation. - Interpret and evaluate an algebraic expression. - Identify and generate equivalent expressions. - Add, subtract, and factor linear expressions with rational coefficients. Review/Assess - Write an equation to represent a situation. - Solve equations that contain addition and subtraction. - Solve equations that contain multiplication and division. - Write and use one-step equations to represent situations and solve problems. - Write and graph inequalities to represent real-world situations. - Solve one-step equations that involve negative integers, fractions, and decimals. Review/Assess	Vocabulary <table><tr><th>New</th><th>Review</th></tr><tr><td> - base - exponent - evaluate - numerical expression - term - algebraic expression - coefficient - constant - variable - equivalent expressions - like terms - equation - solution of an equation - Addition Property of Equality - Subtraction Property of Equality - Division Property of Equality - Multiplication Property of Equality - constraint </td><td> - Distributive Property - order of operations - Celsius - evaluate - Fahrenheit - perimeter - Associative Property of Addition - Associative Property of Multiplication - Commutative Property of Addition - Commutative Property of Multiplication - equilateral triangle - quadrilateral - angle - degree - coordinate grid </td></tr></table>		New	Review	- base - exponent - evaluate - numerical expression - term - algebraic expression - coefficient - constant - variable - equivalent expressions - like terms - equation - solution of an equation - Addition Property of Equality - Subtraction Property of Equality - Division Property of Equality - Multiplication Property of Equality - constraint
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• Represent an equation in a table or graph. • Write an equation given a verbal description of a relationship. • Write an equation using a table or graph.	• inequality • solution of an inequality • dependent variable • independent variable	
Review/Assess	Differentiation	
Connections to Catholic Identity / Other Subjects Religion/Catholic Identity: • The ephah and the bath shall be the same quantity, so that the bath will contain a tenth of a homer and the ephah a tenth of a homer; their standard shall be according to the homer. The shekel shall be twenty gerahs; twenty shekels, twenty-five shekels, and fifteen shekels shall be your maneh. (Ez 45:11-12) • Or what woman, if she has ten silver coins and loses one coin, does not light a lamp and sweep the house and search carefully until she finds it? (Luke 15:8) Other Subject Here: • STEM: In order to make action look real in computer games, mathematicians and software developers came up with complicated equations of how human motion works. The software for computer games has more equations in it than one could possibly imagine.	Enrichment • Generate and Simplify Complex Expressions – Challenge students to create and simplify multi-step algebraic expressions involving exponents, variables, and the distributive property, then justify equivalence. • Translate Real-World Scenarios into Multi-Step Equations – Encourage students to write and solve equations from layered word problems involving multiple operations, rational coefficients, or constraints. • Analyze Variable Relationships Graphically – Have students compare different equations by analyzing how changes in coefficients affect the graph and interpreting the meaning of slope and intercept. • Explore Constraints Through Inequality Modeling – Guide students in modeling real-world constraints using inequalities, graphing the solution sets, and interpreting their practical implications. • Compare Representations of Functions – Ask students to convert between verbal, tabular, and graphical representations of equations and discuss the strengths of each representation. Support • Use Color Coding and Algebra Tiles – Provide visual supports to help students distinguish between constants, coefficients, and variables when simplifying or combining like terms. • Step-by-Step Equation Solving Frames – Scaffold the process of solving one-step equations using structured templates that guide students through identifying operations and checking their work. • Real-Life Contexts for Expressions and Equations – Incorporate relatable examples (e.g., shopping totals, sports stats) to help students translate between words, numbers, and symbols. • Graphing With Purposeful Structure – Use pre-labeled graph templates with specific x- and y-values and highlight the roles of independent and dependent variables. • Practice with Sentence Frames and Vocabulary Support – Reinforce key math language with sentence starters like “The variable represents...” or “To solve the equation, I need to...”	

Standards & Benchmarks

Numerical and Algebraic Expressions:

6.NS.7

Apply the properties of operations (i.e., identity, inverse, commutative, associative, distributive properties) to create equivalent linear expressions and to justify whether two linear expressions are equivalent when the two expressions name the same number regardless of which value is substituted into them. (E)

7.AF.1

Apply the properties of operations (e.g., identity, inverse, commutative, associative, distributive properties) to create equivalent linear expressions, including situations that involve factoring out a common number (e.g., given $2x - 10$, create an equivalent expression $2(x - 5)$). Justify each step in the process. (E)

6.AF.1

Define and use multiple variables when writing expressions to represent real-world and other mathematical problems, and evaluate them for given values. (E)

6.NS.5

Apply the order of operations and properties of operations (i.e., identity, inverse, commutative properties of addition and multiplication, associative properties of addition and multiplication, and distributive property) to evaluate numerical expressions with nonnegative rational numbers, including those using grouping symbols, such as parentheses, and involving whole number exponents. (E)

6.EE.B.6

Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number or depending on the purpose at hand, any number in a specified set.

7.EE.A.2

Describe how rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related. For example, $a + 0.05a = 1.05a$ means that "increase by 5%" is the same as "multiply by 1.05."

6.EE.A.3

Apply the properties of operations to generate equivalent expressions. Know that expressions are called equivalent when they name the same number regardless of which value is substituted into them. For example, apply the distributive property to the expression $3(2 + x)$ to produce the equivalent expression $6 + 3x$; apply the distributive property to the expression $24x + 18y$ to produce the equivalent expression $6(4x + 3y)$; apply properties of operations to $y + y + y$ to produce the equivalent expression $3y$.

6.EE.A.2.b

Identify parts of an expression using mathematical terms (sum, term, product, factor, quotient, coefficient); view one or more parts of an expression as a single entity. For example, describe the expression $2(8 + 7)$ as a product of two factors; view $(8 + 7)$ as both a single entity and a sum of two terms.

6.EE.A.2.a

Write expressions that record operations with numbers and with letters standing for numbers. For example, express the calculation "Subtract y from 5" as $5 - y$.

6.EE.A.4

Describe the properties of operations used to show two expressions are equivalent. For example, show that $3c + 3cd$ and $3c(1 + d)$ are equivalent.

7.EE.A.1

Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.

6.EE.A.1

Write and evaluate numerical expressions involving whole-number exponents.

6.EE.A.2.c

Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including those involving whole-number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations). For example, use the formulas $V = s^3$ and $A = 6s^2$ to find the volume and surface area of a cube with sides of length $s = 1/2$.

6.EE.1

Write and evaluate numerical expressions involving whole-number exponents.

6.EE.2b

Identify parts of an expression using mathematical terms (sum, term, product, factor, quotient, coefficient); view one or more parts of an expression as a single entity.

Solve Problems Using Equations and Inequalities:

8.NS.4

Solve real-world problems with rational numbers by using multiple operations. (E)

6.AF.4

Write an inequality of the form $x > c$, $x \geq c$, $x < c$, or $x \leq c$, where c is a rational number, to represent a constraint or condition in a real-world or other mathematical problem. Explain that inequalities have infinitely many solutions and how to represent solutions on a number line diagram.

6.AF.3

Solve equations of the form $x + p = q$, $x - p = q$, $px = q$, and $x/p = q$ fluently for cases in which p , q and x are all nonnegative rational numbers. Represent real-world problems using equations of these forms and solve such problems. (E)

6.AF.2

Demonstrate which values from a specified set, if any, make the equation or inequality true. Use substitution to determine whether a given number in a specified set makes an equation or inequality true. (E)

7.AF.2

Solve real-world problems with rational numbers by using one or two operations. (E)

7.NS.7

Compute fluently with rational numbers using an algorithmic approach. (E)

7.NS.A.3

Solve real-world and mathematical problems involving the four operations with rational numbers. Computations with rational numbers extend the rules for manipulating fractions to complex fractions, a fraction within a fraction.

6.EE.B.7

Solve real-world and mathematical problems by writing and solving equations of the form $x + p = q$ and $px = q$ for cases in which p , q and x are all nonnegative rational numbers.

6.EE.B.5

Use substitution to determine whether a given number in a specified set makes an equation or inequality true. Solving an equation or inequality is a process of answering a question: Which values from a specified set, if any, make the equation or inequality true?

6.EE.B.8

Write an inequality of the form $x > c$ or $x < c$ to represent a constraint or condition in a real-world or mathematical problem. Recognize that an inequality of the form $x > c$ or $x < c$ has infinitely many solutions; use a number line diagram to represent infinitely many solutions of such an inequality.

6.EE.8

Write an inequality of the form $x > c$ or $x < c$ to represent a constraint or condition in a real-world or mathematical problem. Recognize that inequalities of the form $x > c$ or $x < c$ have infinitely many solutions; represent solutions of such inequalities on number line diagrams.

6.EE.7

Solve real-world and mathematical problems by writing and solving equations of the form $x + p = q$ and $px = q$ for cases in which p , q and x are all nonnegative rational numbers.

7.NS.3

Solve real-world and mathematical problems involving the four operations with rational numbers.

6.EE.5

Understand solving an equation or inequality as a process of answering a question: which values from a specified set, if any, make the equation or inequality true? Use substitution to determine whether a given number in a specified set makes an equation or inequality true.

7.CE.1

The student will estimate, solve, and justify solutions to multistep contextual problems involving operations with rational numbers.

7.A.2.a

Write one- and two-step equations involving rational numbers from words, tables, and authentic situations.

7.N.2.b

Apply properties of operations (commutative, associative, distributive, identity, inverse, zero) as strategies for problem solving with rational numbers.

6.A.1.3

Use and evaluate variables in expressions, equations, and inequalities that arise from various contexts, including determining when or if, for a given value of the variable, an equation or inequality involving a variable is true or false.

Real-World Relationships Between Variables:**6.RP.5**

Use variables to represent two quantities in a proportional relationship in a real-world problem; write an equation to express one quantity, the dependent variable, in terms of the other quantity, the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation. (E)

6.EE.C.9

Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity in terms of the other quantity. Analyze the relationship between the dependent and independent variables using graphs and tables and relate these to the equation. For example, in a problem involving motion at constant speed, list and graph ordered pairs of distances and times, and write the equation $d = 65t$ to represent the relationship between distance and time.

6.EE.9

Use variables to represent two quantities in a real-world problem that change in relationship to one another. Write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation.

Teaching Ideas/Resources

Websites/Resources:

- [Graspable Math-Solving One-Step Equations](#) – Use this interactive to guide students in solving one-step equations correctly.
- Expressions and Equations: [Algebra Equations](#)
- Equations and inequalities [Equations and Inequalities](#).
- [Gimkit - live learning game show](#)-there is a free part and a paid part; the free part provides games that are just as engaging as the paid section
- [Mash Up Math](#) provides games, worksheets, etc...
- [Writing Expressions Worksheet](#) – Kuta Software worksheet that practices writing algebraic expressions and verbal expressions.
- [Order of Operations Video](#) – Math Antics is a great resource for videos, this video gives the why and how of using the order of operations.
- [Order of Operations Seek and Solve](#)- Seek and Solve (Scavenger Hunt) with a sheet for students to record answers.
- [Delta Math](#) Website for all Standards
- [Math Aids](#) - Expressions Worksheets
- [Demos](#) - Activity Builder for Expressions and Equations