

Unit Title: “Yearbook Sales: Exponents and Quadratic Equations”

Course: Algebra I (Middle School)

Subject Area: Mathematics

Time Frame: 13 days

Standards

Algebra I Standards	Sunshine State Standards Benchmarks	NCEE New Standards
<p>The student will:</p> <p>6.1 Simplify expressions involving exponents.</p> <p>6.2 Add and subtract polynomials.</p> <p>6.3 Multiply polynomials.</p> <p>6.4 Factor integers and find the greatest common factor for sets of integers.</p> <p>6.5 Find the monomial factors of given polynomials.</p> <p>6.6 Simplify quotients of monomials.</p> <p>6.7 Divide polynomials by monomials.</p> <p>6.8 Factor differences of squares, trinomial squares, and trinomials that are not perfect squares.</p> <p>6.9 Factor by grouping.</p> <p>6.10 Solve equations by factoring.</p> <p>9.1 Simplify algebraic fractions.</p>	<p>MA.A.2.3.1 The student understands and uses exponential and scientific notation.</p> <p><i>Expectations</i> The student:</p> <ul style="list-style-type: none"> Expresses rational numbers in exponential notation including negative exponents (for example $2^{-3} = \frac{1}{2^3} = \frac{1}{8}$). Expresses rational numbers in scientific or standard notation including decimals between 0 and 1. Evaluates numerical or algebraic expressions that contain exponential notation. <p>MA.A.3.3.3 The student adds, subtracts, multiplies, and divides whole numbers, decimals, and fractions, including mixed numbers, to solve real-world problems using appropriate</p>	<p>The student:</p> <p>M1b Uses and understands the inverse relationships between addition and subtraction, multiplication and division, and exponentiation and root-extraction; uses the inverse operation to determine unknown quantities in equations.</p> <p>M3a Discovers, describes, and generalizes patterns, including linear, exponential, and simple quadratic relationships, i.e., those of the form $f(n) = n^2$ or $f(n) = cn^2$, for constant c, including $A = \pi r^2$, and represents them with variables and expressions.</p> <p>M3b Represents relationships with tables, graphs in the coordinate plane, and verbal or symbolic rules.</p> <p>M3c Analyzes tables, graphs, and rules to determine functional relationships.</p> <p>M3d Finds solutions for unknown quantities in linear equations and in simple equations and inequalities.</p> <p>M5b Makes the basic choices involved in</p>

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	<p>methods of computing, such as mental mathematics, paper and pencil, and calculator.</p> <p><i>Expectations</i> The student:</p> <ul style="list-style-type: none"> Solve multi-step real-world problems involving fractions, decimals, and integers using appropriate methods of computations, such as mental computation, paper and pencil and calculator. <p>MA.D.2.3.2 The student uses algebraic problem-solving strategies to solve real-world problems involving linear equations and inequalities.</p> <p><i>Expectations</i> The student</p> <ul style="list-style-type: none"> Simplifies algebraic expressions with a maximum of two variables. Solve single- and multi-step linear equations and inequalities that represent real-world situations. 	<p>planning and carrying out a solution.</p> <p>M6a Computes accurately with arithmetic operations on rational numbers.</p> <p>M6b Knows and uses the correct order of operations for arithmetic computations.</p> <p>M6f Uses equations, formulas, and simple algebraic notation appropriately.</p>

Desired Results

Enduring Understanding	Essential Questions	Knowledge and Skills
<p>Students will understand:</p> <ul style="list-style-type: none"> Although the rules for manipulating exponential expression have diminished in importance as calculator and computer technology takes over algebraic bookkeeping, there is still the need to be familiar with the characteristics of tables, graphs, and equations that model exponential patterns of change. Quadratic equations arise from situations that have an underlying multiplicative structure. The power of this form is that it ties together all polynomials as products of linear factors. 	<ul style="list-style-type: none"> What are the formal rules for manipulating exponential expressions? How can I recognize situations in which quantities grow or decay by repeated multiplication? How is an increase in the independent variable related to a change in the dependent variable in a quadratic relationship? Where is the dependent variable changing the most? The least? Where the graphs of a quadratic cross the x-axis? The y-axis? What is the significance of these values in the situation? 	<p>Students will know</p> <ul style="list-style-type: none"> Key terms (i.e., base, exponent, exponential form, standard form, constant term, expanded form, factored form, like terms, parabola, quadratic term). <p>Students will be able to</p> <ul style="list-style-type: none"> Simplify expressions involving exponents. Simplify quotients of monomials. Divide polynomials by monomials. Factor differences of squares, trinomial squares, and trinomials that are not perfect squares. Factor by grouping. Simplify algebraic fractions.

Acceptable Evidence

Performance Tasks	Quizzes, Test, and Work Samples	Observations and Dialogues
<ul style="list-style-type: none"> Factoring Quadratics Students continue the use of the “diamond problems” and “area” to extend factoring quadratics. Properties of Exponents Student extend formulation of laws of exponent to include zero and negative exponents. 	<p>Check-Up 1 Quiz A Check-Up 2 Quiz B Unit Test Unit Project – Yearbook Sales</p>	<p>Teacher observations of students during work on performance tasks. Accountable talk during work on performance tasks.</p>