

## Middle School Programs Building Healthy Core Learning Common Core Math I, Unit 6

## Math I UNIT 6 OVERVIEW: Quadratic Functions

Unit Outcomes			Key Vocabulary	
	At the end of this unit, your student should be able to:		Terms to deepen the student's understanding	
$\checkmark$	Determine whether an expression is a polynomial	✓	Axis of Symmetry	
$\checkmark$	Add, subtract, multiply polynomials (limit to addition and	$\checkmark$	Binomial	
,	subtraction of quadratics and multiplication of linear expressions).	$\checkmark$	Constant	
~	Identify the coefficients and constants of a quadratic function and	$\checkmark$	Degree of a monomial	
	interpret them in a contextual situation.	$\checkmark$	Degree of a polynomial	
~	Sketch the graph of a quadratic function and interpret key features	$\checkmark$	Difference of Squares	
	in context, including domain, range, intercepts; intervals where the	$\checkmark$	Extreme Values	
	function is increasing, decreasing, positive, or negative; relative	✓	Factoring	
./	maximum or minimum; and symmetry.	$\checkmark$	Greatest Common Factor	
v	Determine II a function is a quadratic function.	$\checkmark$	Intercepts	
v	ose quadratic functions to model relationships between two	$\checkmark$	Intervals where Increasing, Decreasing,	
1	quantities.		Positive or Negative	
v	the function	$\checkmark$	Linear expression	
$\checkmark$	Given a guadratic function in context, determine the practical	$\checkmark$	Monomial	
·	domain of the function <i>lipput</i> values that make sonse to the	$\checkmark$	Polynomial	
	constraints of the problem context)	$\checkmark$	Relative Maximum or Minimum	
$\checkmark$	Recognize equivalent forms of quadratic functions. For example	$\checkmark$	Solutions	
	standard form $y = \alpha x^2 + bx + c$ and factored form $y = \alpha (x - r_1)(x - r_2)$	$\checkmark$	Standard form of a polynomial	
$\checkmark$	Compare properties of two quadratics each represented in a	$\checkmark$	Symmetry	
	different way (algebraically graphically numerically in tables or	$\checkmark$	Trinomial	
	by verbal description).	$\checkmark$	Vertex	
		$\checkmark$	x-intercepts of a Quadratic Function	
		1		
	Key Standards Addressed		Zeros	
	Key Standards Addressed	v	Vhere This Unit Fits	
	Key Standards Addressed Connections to Common Core/NC Essential Standards	•	Where This Unit Fits Connections to prior and future learning	
N-Q	Key Standards Addressed Connections to Common Core/NC Essential Standards 1 Use units as a way to understand problems and to guide the solution	v Co	Where This Unit Fits Connections to prior and future learning ming into this unit, students should have a	
N-Q of m	Key Standards Addressed Connections to Common Core/NC Essential Standards 1 Use units as a way to understand problems and to guide the solution ulti-step problems; choose and interpret units consistently in formulas;	v Co str	Where This Unit Fits Connections to prior and future learning ming into this unit, students should have a ong foundation in:	
N-Q of m choo	Key Standards Addressed Connections to Common Core/NC Essential Standards 1 Use units as a way to understand problems and to guide the solution ulti-step problems; choose and interpret units consistently in formulas; use and interpret the scale and the origin in graphs and data displays	v Co str √	Where This Unit Fits Connections to prior and future learning ming into this unit, students should have a ong foundation in: Solving one variable equations	
N-Q of m choo A-AI	Key Standards Addressed Connections to Common Core/NC Essential Standards 1 Use units as a way to understand problems and to guide the solution ulti-step problems; choose and interpret units consistently in formulas; ose and interpret the scale and the origin in graphs and data displays 'R.1 Understand that polynomials form a system analogous to the	✓ Co str ✓	Where This Unit Fits Connections to prior and future learning ming into this unit, students should have a ong foundation in: Solving one variable equations Graphing linear functions	
N-Q of m choo A-AI integ	Key Standards Addressed Connections to Common Core/NC Essential Standards 1 Use units as a way to understand problems and to guide the solution ulti-step problems; choose and interpret units consistently in formulas; ose and interpret the scale and the origin in graphs and data displays PR.1 Understand that polynomials form a system analogous to the gers, namely, they are closed under the operations of addition,	v Co str √ √	Where This Unit Fits Connections to prior and future learning ming into this unit, students should have a ong foundation in: Solving one variable equations Graphing linear functions Linear and exponential functions	
N-Q of m choo A-AI integ subt	Key Standards Addressed Connections to Common Core/NC Essential Standards 1 Use units as a way to understand problems and to guide the solution ulti-step problems; choose and interpret units consistently in formulas; use and interpret the scale and the origin in graphs and data displays R.1 Understand that polynomials form a system analogous to the gers, namely, they are closed under the operations of addition, raction, and multiplication; add, subtract, and multiply polynomials.	<ul> <li>✓</li> <li>Co</li> <li>str</li> <li>✓</li> <li>✓</li> <li>✓</li> <li>✓</li> <li>✓</li> </ul>	Where This Unit Fits Connections to prior and future learning ming into this unit, students should have a ong foundation in: Solving one variable equations Graphing linear functions Linear and exponential functions Finding the GCF of integers	
N-Q of m choo A-AI integ subt A-CE	Key Standards Addressed Connections to Common Core/NC Essential Standards 1 Use units as a way to understand problems and to guide the solution ulti-step problems; choose and interpret units consistently in formulas; ose and interpret the scale and the origin in graphs and data displays PR.1 Understand that polynomials form a system analogous to the gers, namely, they are closed under the operations of addition, raction, and multiplication; add, subtract, and multiply polynomials. D.2 Create equations in two or more variables to represent iografies between quantities; graph equations on coordinate area with	✓ Co str ✓ ✓ ✓ ✓	Veros         Where This Unit Fits         Connections to prior and future learning         ming into this unit, students should have a         ong foundation in:         Solving one variable equations         Graphing linear functions         Linear and exponential functions         Finding the GCF of integers         Combining like terms	
N-Q of m choo A-Al integ subt A-CE relat	Key Standards Addressed Connections to Common Core/NC Essential Standards 1 Use units as a way to understand problems and to guide the solution ulti-step problems; choose and interpret units consistently in formulas; ose and interpret the scale and the origin in graphs and data displays PR.1 Understand that polynomials form a system analogous to the gers, namely, they are closed under the operations of addition, raction, and multiplication; add, subtract, and multiply polynomials. D.2 Create equations in two or more variables to represent ionships between quantities; graph equations on coordinate axes with and scales	<ul> <li>✓</li> <li>Co</li> <li>str</li> <li>✓</li> </ul>	Where This Unit Fits         Connections to prior and future learning         ming into this unit, students should have a         ong foundation in:         Solving one variable equations         Graphing linear functions         Linear and exponential functions         Finding the GCF of integers         Combining like terms         The Distributive Property	
N-Q of m choc A-Al integ subt A-CE relat labe	Key Standards Addressed Connections to Common Core/NC Essential Standards.1 Use units as a way to understand problems and to guide the solution ulti-step problems; choose and interpret units consistently in formulas; ose and interpret the scale and the origin in graphs and data displays?R.1 Understand that polynomials form a system analogous to the gers, namely, they are closed under the operations of addition, raction, and multiplication; add, subtract, and multiply polynomialsD.2 Create equations in two or more variables to represent ionships between quantities; graph equations on coordinate axes with Is and scales.E.1 Interpret parts of an expression, such as terms, factors, and	<ul> <li>✓</li> <li>Co</li> <li>str</li> <li>✓</li> <l< td=""><td>Where This Unit Fits         Connections to prior and future learning         ming into this unit, students should have a         ong foundation in:         Solving one variable equations         Graphing linear functions         Linear and exponential functions         Finding the GCF of integers         Combining like terms         The Distributive Property         Identifying key features of a function from a</td></l<></ul>	Where This Unit Fits         Connections to prior and future learning         ming into this unit, students should have a         ong foundation in:         Solving one variable equations         Graphing linear functions         Linear and exponential functions         Finding the GCF of integers         Combining like terms         The Distributive Property         Identifying key features of a function from a	
N-Q of m choc A-AI integ subt A-CE relat labe A-SS coef	Key Standards Addressed Connections to Common Core/NC Essential Standards 1 Use units as a way to understand problems and to guide the solution ulti-step problems; choose and interpret units consistently in formulas; ose and interpret the scale and the origin in graphs and data displays PR.1 Understand that polynomials form a system analogous to the gers, namely, they are closed under the operations of addition, raction, and multiplication; add, subtract, and multiply polynomials. D.2 Create equations in two or more variables to represent ionships between quantities; graph equations on coordinate axes with Is and scales. E.1 Interpret parts of an expression, such as terms, factors, and ficients.	<ul> <li>✓</li> <li>Co</li> <li>str</li> <li>✓</li> <l< td=""><td>Where This Unit Fits         Connections to prior and future learning         ming into this unit, students should have a         ong foundation in:         Solving one variable equations         Graphing linear functions         Linear and exponential functions         Finding the GCF of integers         Combining like terms         The Distributive Property         Identifying key features of a function from a         graph</td></l<></ul>	Where This Unit Fits         Connections to prior and future learning         ming into this unit, students should have a         ong foundation in:         Solving one variable equations         Graphing linear functions         Linear and exponential functions         Finding the GCF of integers         Combining like terms         The Distributive Property         Identifying key features of a function from a         graph	
N-Q of m choo A-Al integ subt A-CE relat labe A-SS coef A-SS	Key Standards Addressed Connections to Common Core/NC Essential Standards 1 Use units as a way to understand problems and to guide the solution ulti-step problems; choose and interpret units consistently in formulas; ose and interpret the scale and the origin in graphs and data displays PR.1 Understand that polynomials form a system analogous to the gers, namely, they are closed under the operations of addition, raction, and multiplication; add, subtract, and multiply polynomials. D.2 Create equations in two or more variables to represent ionships between quantities; graph equations on coordinate axes with ls and scales. E.1 Interpret parts of an expression, such as terms, factors, and ficients. E.2 Use the structure of an expression to identify ways to rewrite it.	▼ Co str √ √ √ √ √ √	Where This Unit Fits         Connections to prior and future learning         ming into this unit, students should have a         ong foundation in:         Solving one variable equations         Graphing linear functions         Linear and exponential functions         Finding the GCF of integers         Combining like terms         The Distributive Property         Identifying key features of a function from a         graph	
N-Q of m choo A-AI integ subt A-CE relat labe A-SS coef A-SS A-SS	Key Standards Addressed Connections to Common Core/NC Essential Standards 1 Use units as a way to understand problems and to guide the solution ulti-step problems; choose and interpret units consistently in formulas; ose and interpret the scale and the origin in graphs and data displays PR.1 Understand that polynomials form a system analogous to the gers, namely, they are closed under the operations of addition, raction, and multiplication; add, subtract, and multiply polynomials. D.2 Create equations in two or more variables to represent ionships between quantities; graph equations on coordinate axes with ls and scales. E.1 Interpret parts of an expression, such as terms, factors, and ficients. E.2 Use the structure of an expression to identify ways to rewrite it. E.3 Choose and produce an equivalent form of an expression to reveal	<ul> <li>✓</li> <li>✓</li></ul>	Where This Unit Fits         Connections to prior and future learning         ming into this unit, students should have a         ong foundation in:         Solving one variable equations         Graphing linear functions         Linear and exponential functions         Finding the GCF of integers         Combining like terms         The Distributive Property         Identifying key features of a function from a         graph	
N-Q of m choo A-AI integ subt A-CE relat labe A-SS coef A-SS A-SS and	Key Standards Addressed Connections to Common Core/NC Essential Standards 1 Use units as a way to understand problems and to guide the solution ulti-step problems; choose and interpret units consistently in formulas; ose and interpret the scale and the origin in graphs and data displays PR.1 Understand that polynomials form a system analogous to the gers, namely, they are closed under the operations of addition, raction, and multiplication; add, subtract, and multiply polynomials. D.2 Create equations in two or more variables to represent ionships between quantities; graph equations on coordinate axes with ls and scales. E.1 Interpret parts of an expression, such as terms, factors, and ficients. E.2 Use the structure of an expression to identify ways to rewrite it. E.3 Choose and produce an equivalent form of an expression to reveal explain properties of the quantity represented by the expression.	✓     ✓	Where This Unit Fits         Connections to prior and future learning         ming into this unit, students should have a       ong foundation in:         Solving one variable equations       Graphing linear functions         Linear and exponential functions       Finding the GCF of integers         Combining like terms       The Distributive Property         Identifying key features of a function from a graph	
N-Q of m choo A-Al integ subt A-CE relat labe A-SS coef A-SS and a. Fa	Key Standards Addressed Connections to Common Core/NC Essential Standards 1 Use units as a way to understand problems and to guide the solution ulti-step problems; choose and interpret units consistently in formulas; ose and interpret the scale and the origin in graphs and data displays PR.1 Understand that polynomials form a system analogous to the gers, namely, they are closed under the operations of addition, raction, and multiplication; add, subtract, and multiply polynomials. D.2 Create equations in two or more variables to represent ionships between quantities; graph equations on coordinate axes with ls and scales. E.1 Interpret parts of an expression, such as terms, factors, and ficients. E.2 Use the structure of an expression to identify ways to rewrite it. E.3 Choose and produce an equivalent form of an expression to reveal explain properties of the quantity represented by the expression. ctor a quadratic expression to reveal the zeros of the function it	<ul> <li>✓</li> <li>Coo</li> <li>str</li> <li>✓</li> <li>✓<!--</td--><td>Where This Unit Fits         Connections to prior and future learning         ming into this unit, students should have a       ong foundation in:         Solving one variable equations       Graphing linear functions         Linear and exponential functions       Finding the GCF of integers         Combining like terms       The Distributive Property         Identifying key features of a function from a graph</td></li></ul>	Where This Unit Fits         Connections to prior and future learning         ming into this unit, students should have a       ong foundation in:         Solving one variable equations       Graphing linear functions         Linear and exponential functions       Finding the GCF of integers         Combining like terms       The Distributive Property         Identifying key features of a function from a graph	
N-Q of m choo A-AI integ subt A-CE relat labe A-SS coef A-SS A-SS and a. Fa defin	Key Standards Addressed Connections to Common Core/NC Essential Standards 1 Use units as a way to understand problems and to guide the solution ulti-step problems; choose and interpret units consistently in formulas; ose and interpret the scale and the origin in graphs and data displays PR.1 Understand that polynomials form a system analogous to the gers, namely, they are closed under the operations of addition, raction, and multiplication; add, subtract, and multiply polynomials. ED.2 Create equations in two or more variables to represent tionships between quantities; graph equations on coordinate axes with ls and scales. E.1 Interpret parts of an expression, such as terms, factors, and ficients. E.2 Use the structure of an expression to identify ways to rewrite it. E.3 Choose and produce an equivalent form of an expression to reveal explain properties of the quantity represented by the expression. ctor a quadratic expression to reveal the zeros of the function it nes.	v Co str ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓	Where This Unit Fits         Connections to prior and future learning         ming into this unit, students should have a       ong foundation in:         Solving one variable equations       Graphing linear functions         Linear and exponential functions       Finding the GCF of integers         Combining like terms       The Distributive Property         Identifying key features of a function from a graph         is unit builds to the following future skills         d concepts:	
N-Q of m choo A-AI integ subt A-CE relat labe A-SS coef A-SS and a. Fa defin Note	Key Standards Addressed Connections to Common Core/NC Essential Standards 1 Use units as a way to understand problems and to guide the solution ulti-step problems; choose and interpret units consistently in formulas; ose and interpret the scale and the origin in graphs and data displays PR.1 Understand that polynomials form a system analogous to the gers, namely, they are closed under the operations of addition, raction, and multiplication; add, subtract, and multiply polynomials. ED.2 Create equations in two or more variables to represent tionships between quantities; graph equations on coordinate axes with ls and scales. E.1 Interpret parts of an expression, such as terms, factors, and ficients. E.2 Use the structure of an expression to identify ways to rewrite it. E.3 Choose and produce an equivalent form of an expression to reveal explain properties of the quantity represented by the expression. ctor a quadratic expression to reveal the zeros of the function it nes. ": At this level, the limit is quadratic expressions of the form $ax^2 + bx + c$ .	v Co str ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓	Where This Unit Fits         Connections to prior and future learning         ming into this unit, students should have a       ong foundation in:         Solving one variable equations       Graphing linear functions         Linear and exponential functions       Finding the GCF of integers         Combining like terms       The Distributive Property         Identifying key features of a function from a graph         is unit builds to the following future skills         d concepts:         Eactoring quadratic equations with a leading	
N-Q of m choo A-Al integ subt A-CE relat labe A-SS coef A-SS and a. Fa defin Note F-IF.	Key Standards Addressed Connections to Common Core/NC Essential Standards 1 Use units as a way to understand problems and to guide the solution ulti-step problems; choose and interpret units consistently in formulas; use and interpret the scale and the origin in graphs and data displays PR.1 Understand that polynomials form a system analogous to the gers, namely, they are closed under the operations of addition, raction, and multiplication; add, subtract, and multiply polynomials. ED.2 Create equations in two or more variables to represent clonships between quantities; graph equations on coordinate axes with ls and scales. E.1 Interpret parts of an expression, such as terms, factors, and ficients. E.2 Use the structure of an expression to identify ways to rewrite it. E.3 Choose and produce an equivalent form of an expression to reveal explain properties of the quantity represented by the expression. ctor a quadratic expression to reveal the zeros of the function it nes. :: At this level, the limit is quadratic expressions of the form $ax^2 + bx + c$ . 4 For a function that models a relationship between two quantities,	v Co str ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ Th an.✓	Where This Unit Fits         Connections to prior and future learning         ming into this unit, students should have a       ong foundation in:         Solving one variable equations       Graphing linear functions         Linear and exponential functions       Finding the GCF of integers         Combining like terms       The Distributive Property         Identifying key features of a function from a graph       graph         is unit builds to the following future skills       d concepts:         Factoring quadratic equations with a leading coefficient other than one       Solving with a leading	
N-Q of m choo A-Al integ subt A-CE relat labe A-SS A-SS and a. Fa defin Note F-IF. integ	Key Standards Addressed Connections to Common Core/NC Essential Standards 1 Use units as a way to understand problems and to guide the solution ulti-step problems; choose and interpret units consistently in formulas; use and interpret the scale and the origin in graphs and data displays PR.1 Understand that polynomials form a system analogous to the gers, namely, they are closed under the operations of addition, raction, and multiplication; add, subtract, and multiply polynomials. ED.2 Create equations in two or more variables to represent clonships between quantities; graph equations on coordinate axes with ls and scales. E.1 Interpret parts of an expression, such as terms, factors, and ficients. E.2 Use the structure of an expression to identify ways to rewrite it. E.3 Choose and produce an equivalent form of an expression to reveal explain properties of the quantity represented by the expression. ctor a quadratic expression to reveal the zeros of the function it nes. *: At this level, the limit is quadratic expressions of the form ax <sup>2</sup> + bx + c. <b>4</b> For a function that models a relationship between two quantities, pret key features of graphs and tables in terms of the quantities, and	<ul> <li>✓</li> <li>Coostr</li> <li>✓</li> </ul>	Where This Unit Fits         Connections to prior and future learning         ming into this unit, students should have a       ong foundation in:         Solving one variable equations       Graphing linear functions         Linear and exponential functions       Finding the GCF of integers         Combining like terms       The Distributive Property         Identifying key features of a function from a graph       graph         is unit builds to the following future skills       d concepts:         Factoring quadratic equations with a leading coefficient other than one       Solving systems of equations	
N-Q of m choo A-AI integ subt A-CE relat labe A-SS Coef A-SS A-SS and a. Fa defin Note F-IF. integ sket	<ul> <li>Key Standards Addressed Connections to Common Core/NC Essential Standards</li> <li>Use units as a way to understand problems and to guide the solution ulti-step problems; choose and interpret units consistently in formulas; use and interpret the scale and the origin in graphs and data displays</li> <li>Understand that polynomials form a system analogous to the gers, namely, they are closed under the operations of addition, raction, and multiplication; add, subtract, and multiply polynomials.</li> <li>Create equations in two or more variables to represent clonships between quantities; graph equations on coordinate axes with ls and scales.</li> <li>Interpret parts of an expression, such as terms, factors, and ficients.</li> <li>Schose and produce an equivalent form of an expression to reveal explain properties of the quantity represented by the expression. ctor a quadratic expression to reveal the zeros of the function it nes.</li> <li>A this level, the limit is quadratic expressions of the form ax<sup>2</sup> + bx + c.</li> <li>For a function that models a relationship between two quantities, pret key features of graphs and tables in terms of the quantities, and ch graphs showing key features given a verbal description of the ionship key features given a verbal description of the</li> </ul>	<ul> <li>✓</li> <li>Co str</li> <li>✓</li> <li>✓&lt;</li></ul>	Where This Unit Fits         Connections to prior and future learning         ming into this unit, students should have a       ong foundation in:         Solving one variable equations       Graphing linear functions         Linear and exponential functions       Finding the GCF of integers         Combining like terms       The Distributive Property         Identifying key features of a function from a graph         is unit builds to the following future skills         d concepts:         Factoring quadratic equations with a leading coefficient other than one         Solving systems of equations	
N-Q of m choo A-AI integ subt A-CE relat labe A-SS A-SS and a. Fa defin Note F-IF. integ sket relat	Key Standards Addressed Connections to Common Core/NC Essential Standards <b>1</b> Use units as a way to understand problems and to guide the solution ulti-step problems; choose and interpret units consistently in formulas; ose and interpret the scale and the origin in graphs and data displays <b>PR.1</b> Understand that polynomials form a system analogous to the gers, namely, they are closed under the operations of addition, raction, and multiplication; add, subtract, and multiply polynomials. <b>D.2</b> Create equations in two or more variables to represent clonships between quantities; graph equations on coordinate axes with Is and scales. <b>E.1</b> Interpret parts of an expression, such as terms, factors, and ficients. <b>E.2</b> Use the structure of an expression to identify ways to rewrite it. <b>E.3</b> Choose and produce an equivalent form of an expression to reveal explain properties of the quantity represented by the expression. ctor a quadratic expression to reveal the zeros of the form $ax^2 + bx + c$ . <b>4</b> For a function that models a relationship between two quantities, pret key features of graphs and tables in terms of the quantities, and ch graphs showing key features given a verbal description of the ionship. <i>Key features include: intercepts; intervals where the function is yosing decreasing nositive or negative: relative maximume and</i>	▼ Coo str ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓	Where This Unit Fits         Connections to prior and future learning         ming into this unit, students should have a         ong foundation in:         Solving one variable equations         Graphing linear functions         Linear and exponential functions         Finding the GCF of integers         Combining like terms         The Distributive Property         Identifying key features of a function from a graph         is unit builds to the following future skills         d concepts:         Factoring quadratic equations with a leading coefficient other than one         Solving systems of equations         Graphing and analyzing more complex functions (including inverse step)	
N-Q of m choo A-Al integ subt A-CE relat labe A-SS and a. Fa defin Note F-IF. integ sket relat	Key Standards Addressed Connections to Common Core/NC Essential Standards <b>1</b> Use units as a way to understand problems and to guide the solution ulti-step problems; choose and interpret units consistently in formulas; ose and interpret the scale and the origin in graphs and data displays <b>PR.1</b> Understand that polynomials form a system analogous to the gers, namely, they are closed under the operations of addition, raction, and multiplication; add, subtract, and multiply polynomials. <b>D.2</b> Create equations in two or more variables to represent tionships between quantities; graph equations on coordinate axes with Is and scales. <b>E.1</b> Interpret parts of an expression, such as terms, factors, and ficients. <b>E.2</b> Use the structure of an expression to identify ways to rewrite it. <b>E.3</b> Choose and produce an equivalent form of an expression to reveal explain properties of the quantity represented by the expression. ctor a quadratic expression to reveal the zeros of the form $ax^2 + bx + c$ . <b>4</b> For a function that models a relationship between two quantities, rpret key features of graphs and tables in terms of the quantities, and ch graphs showing key features given a verbal description of the ionship. <i>Key features include: intercepts; intervals where the function is vasing, decreasing, positive, or negative; relative maximums and mums; symmetries: end behavior; and periodicity. Note: At this level</i>	▼ Co str √ √ √ √ √ √ Th ann √ √	Where This Unit Fits         Connections to prior and future learning         ming into this unit, students should have a ong foundation in:         Solving one variable equations         Graphing linear functions         Linear and exponential functions         Finding the GCF of integers         Combining like terms         The Distributive Property         Identifying key features of a function from a graph         is unit builds to the following future skills         d concepts:         Factoring quadratic equations         Graphing and analyzing more complex functions (including inverse, step, exponential absolute value trionnometric	
N-Q of m choo A-Al integ subt A-CE relat labe A-SS A-SS and a. Fa defin Note F-IF. integ sket relat	<ul> <li>Key Standards Addressed Connections to Common Core/NC Essential Standards</li> <li>Use units as a way to understand problems and to guide the solution ulti-step problems; choose and interpret units consistently in formulas; ose and interpret the scale and the origin in graphs and data displays</li> <li>PR.1 Understand that polynomials form a system analogous to the gers, namely, they are closed under the operations of addition, raction, and multiplication; add, subtract, and multiply polynomials.</li> <li>Create equations in two or more variables to represent cionships between quantities; graph equations on coordinate axes with ls and scales.</li> <li>E.1 Interpret parts of an expression, such as terms, factors, and ficients.</li> <li>E.2 Use the structure of an expression to identify ways to rewrite it.</li> <li>E.3 Choose and produce an equivalent form of an expression to reveal explain properties of the quantity represented by the expression. ctor a quadratic expression to reveal the zeros of the function it nes.</li> <li><i>e:</i> At this level, the limit is quadratic expressions of the form ax<sup>2</sup> + bx + c.</li> <li>4 For a function that models a relationship between two quantities, pret key features of graphs and tables in terms of the quantities, and ch graphs showing key features given a verbal description of the ionship. Key features include: intercepts; intervals where the function is 'asing, decreasing, positive, or negative; relative maximums and mums; symmetries; end behavior; and periodicity. Note: At this level, s on linear, exponential and auadratic functions: no end behavior or</li> </ul>	<ul> <li>✓</li> <li>Co str</li> <li>✓</li> <li>✓&lt;</li></ul>	Where This Unit Fits         Connections to prior and future learning         ming into this unit, students should have a ong foundation in:         Solving one variable equations         Graphing linear functions         Linear and exponential functions         Finding the GCF of integers         Combining like terms         The Distributive Property         Identifying key features of a function from a graph         is unit builds to the following future skills         d concepts:         Factoring quadratic equations         Graphing and analyzing more complex functions (including inverse, step, exponential, absolute value, trigonometric and logarithmic functions)	



Middle School Programs Building Healthy Core Learning Common Core Math I, Unit 6

## Math I UNIT 6 OVERVIEW: Quadratic Functions

F-IF.5 Relate the domain of a function to its graph and, where applicable, to	$\checkmark$	Using regression models to predict linear.
the quantitative relationship it describes. For example, if the function $h(n)$		quadratic and exponential models
gives the number of person-hours it takes to assemble n engines in a	$\checkmark$	Understanding graphing and writing
factory, then the positive integers would be an appropriate domain for the		transformations of quadratic parent
function. Note: At this level, focus on linear and exponential functions.		functions
F-IF.7 Graph functions expressed symbolically and show key features of the		luictions
graph, by hand in simple cases and using technology for more complicated	v	Using the Quadratic Formula to solve
cases.		quadratic functions
a. Graph linear and quadratic functions and show intercepts,		
maxima, and minima.		
F-IF.8 Write a function defined by an expression in different but equivalent		
forms to reveal and explain different properties of the function.		
a. Use the process of factoring and completing the square in a		
quadratic function to show zeros extreme values and symmetry		
of the graph and interpret these in terms of a context. <b>Note:</b> At		
this level, only factoring expressions of the form av2 + by +c is		
this level, only juctoring expressions of the joint ux2 + bx +c, is		
expected. Completing the square is not dudressed at this level.		
<b>F-IF.9</b> Compare properties of two functions each represented in a different		
way (algebraically, graphically, numerically in tables, or by verbal		
descriptions). For example, given a graph of one quadratic function and an		
At this level focus on linear, exponential, and augdratic functions		
E-BE 1 Write a function that describes a relationship between two		
quantities		
<b>F-I F.3</b> Observe using graphs and tables that a quantity increasing		
exponentially eventually exceeds a quantity increasing linearly		
quadratically or (more generally) as a polynomial function. <i>Note: At this</i>		
level. limit to linear, exponential, and auadratic functions: general		
polynomial functions are not addressed.		
		"Learning Checks"
Additional Resources		Questions Parents Can Use to Assess
Materials to support understanding and enrichment		Understanding
✓ Quadratic equations overview (notes)	$\checkmark$	How do the coefficients determine the
✓ <u>Quadratic equation solver</u>		shape and the location of the graph of a
✓ Factoring overview (video)		quadratic function?
<ul> <li>Graphing quadratic equations (video)</li> </ul>	✓	What patterns of change are associated with
✓ Factoring GCF (practice)		quadratic functions?
✓ Factor quadratics when a=1 (practice)	✓	When is it appropriate to use a quadratic
<ul> <li>Factor quadratics with a leading coefficient (practice)</li> </ul>		function to model the relationship between
✓ Factoring special cases (practice)		two quantities?
	$\checkmark$	How do you determine the best model for a
		data pattern?

\* Please note, the unit guides are a work in progress. If you have feedback or suggestions on improvement, please feel free to contact wakemiddle@wcpss.net.