

<b>Pine Hill Public Schools</b>			
Content Area:		<b>Mathematics</b>	
Course Title/ Grade Level:		<b>Algebra I</b>	
Unit 1:	<b>Equations and Inequalities</b>	Duration:	<b>16 Days</b>
Unit 2:	<b>Functions</b>	Duration:	<b>12 Days</b>
Unit 3:	<b>Linear Functions</b>	Duration:	<b>18 Days</b>
Unit 4:	<b>Solving Equations and Inequalities</b>	Duration:	<b>20 Days</b>
Unit 5:	<b>Exponents and Polynomials</b>	Duration:	<b>17 Days</b>
Unit 6:	<b>Factoring Polynomials</b>	Duration:	<b>18 Days</b>
Unit 7:	<b>Quadratic Functions and Equations</b>	Duration:	<b>18 Days</b>
Unit 8:	<b>Data Analysis and Probability</b>	Duration:	<b>14 Days</b>
Unit 9:	<b>Exponential and Radical Functions</b>	Duration:	<b>10 Days</b>
Unit 10:	<b>Rational Functions and Equations</b>	Month:	<b>20 Days</b>
BOE Approval Date:		July 17, 2012	

<b>Unit Title: Equations and Inequalities</b>		<b>Unit #: 1</b>
<b>Course or Grade Level: Algebra I</b>		<b>Length of Time:</b> 16 days (2 days per section, 2 review days, 2 summative assessment days)
<b>Pacing</b>	September	
<b>Essential Questions</b>	<ul style="list-style-type: none"> <li>• How does solving equations apply to the real world?</li> <li>• How are inverse operations useful in solving equations?</li> <li>• What is the difference in the strategies used to solve multi-step equations and equations containing a variable on both sides of the equal sign?</li> <li>• How can I use proportions to solve real world problems?</li> <li>• What is the difference between the solution of an equation and an inequality?</li> <li>• What is the difference of the solution of an inequalities that contains a less than/greater than sign compared to a less than or equal to/ greater than or equal to?</li> <li>• What is the difference of a solution to an inequality when multiplied/divided by a positive or negative number?</li> </ul>	
<b>Content</b>	<ul style="list-style-type: none"> <li>• Solving Two-Step and Multi-Step Equations (2-3)</li> <li>• Solving Equations with Variables on both sides (2-4)</li> <li>• Solving for a Variable (2-5)</li> <li>• Proportions with Distribution and Expressions (2-6/2-7)</li> <li>• Solving Two-Step and Multi-Step Inequalities (3-4)</li> <li>• Solving Inequalities with Variables on Both Sides (3-5)</li> </ul>	
<b>Skills</b>	<ul style="list-style-type: none"> <li>• Review solving equations by isolating the variable and using inverse operations</li> <li>• Use the distributive property to simplify multi-step equations</li> <li>• Combine like terms to simplify the left or right side of the equation</li> <li>• Cross multiply involving algebraic expressions to solve for a specific variable</li> <li>• Identify solutions of inequalities</li> <li>• Graph inequality solutions and determine a solution from a graph</li> <li>• Solve inequalities by isolating the variable and using inverse operations</li> </ul>	
<b>Assessments</b>	Formative: <ul style="list-style-type: none"> <li>• Teacher observation and questioning</li> <li>• Seat and or group work</li> <li>• Fist to five/ Thumbs up, thumbs down</li> <li>• Homework</li> <li>• Student participation at board</li> </ul>	Summative: <ul style="list-style-type: none"> <li>• Quizzes, tests and benchmark</li> </ul>
<b>Interventions / differentiated instruction</b>	<ul style="list-style-type: none"> <li>• Students given handouts of power point notes</li> <li>• Students given access to online textbook</li> <li>• Partners or group work (groups formed heterogeneously according to ability)</li> </ul>	
<b>Inter-disciplinary Connections</b>	<ul style="list-style-type: none"> <li>• Using geometry to determine the area and perimeter of shapes</li> <li>• Using geometric shapes to solve proportions involving algebraic expressions</li> </ul>	
<b>Lesson resources / Activities</b>	<ul style="list-style-type: none"> <li>• Holt McDougal Algebra I , copyright 2007 – Chapter 2 &amp; 3</li> <li>• Power point resources</li> <li>• Textbook practice worksheet</li> <li>• Online textbook (<a href="http://www.hrw.com">www.hrw.com</a>)</li> </ul>	
<b>Common Core State Standards</b>		
<b>Grade or Conceptual Category (HS only): Algebra I</b>		
<b>Domain (name and #):</b> Quantities; Seeing Structure in expressions; Creating equations; Reasoning with equations and Inequalities		
<b>Cluster: Reason quantitatively and use</b>	<b>#. Standard:</b>	
	N-Q-1, N-Q-2, A-CED-1, A-CED-4, A-REI-1, A-REI-3	

<b>units to solve problems.</b> <b>Interpret the structure of expressions.</b> <b>Create equations that describe numbers or relationships.</b> <b>Understand solving equations as a process of reasoning and explain the reasoning.</b> <b>Solve equations and inequalities in one variable.</b>	

**Math Practices: Make sense of problems and persevere in solving them, Reason abstractly and quantitatively, Construct viable arguments and critique the reasoning of others, Model with mathematics**

21<sup>st</sup> Century Themes

X	Global Awareness	X	Financial, Economic, Business, and Entrepreneurial Literacy		Civic Literacy		Health Literacy
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21<sup>st</sup> Century Skills

	Creativity and Innovation	X	Critical Thinking and Problem Solving	X	Communication and Collaboration		Information Literacy
	Media Literacy		ICT Literacy	X	Life and Career Skills		

<b>Unit Title: Functions</b>		<b>Unit #: 2</b>
<b>Course or Grade Level: Algebra I</b>		<b>Length of Time: 12 days</b> (2 days per section, 2 review days and 2 summative assessment days)
<b>Pacing</b>	October	
<b>Essential Questions</b>	<ul style="list-style-type: none"> <li>• What is a function?</li> <li>• Why is the range allowed to repeat in a function, but a domain cannot?</li> <li>• What are the steps and strategies of graphing a function from a given equation?</li> </ul>	
<b>Content</b>	<ul style="list-style-type: none"> <li>• Graphing relationships (4-1)</li> <li>• Relations and Functions (4-2)</li> <li>• Writing Functions (4-3)</li> <li>• Graphing Functions (4-4)</li> </ul>	
<b>Skills</b>	<ul style="list-style-type: none"> <li>• Relate graphs to situations, sketch graphs for situations, and write situations for graphs</li> <li>• Find the domain and range of a function</li> <li>• Identify functions</li> <li>• Identify independent and dependent variables of functions</li> <li>• Evaluate functions by the use of substitution</li> <li>• Graph functions</li> </ul>	
<b>Assessments</b>	Formative: <ul style="list-style-type: none"> <li>• Teacher observation and questioning</li> <li>• Seat and or group work</li> <li>• Fist to five/ Thumbs up, thumbs down</li> <li>• Homework</li> <li>• Student participation at board</li> </ul>	Summative: <ul style="list-style-type: none"> <li>• Quizzes, tests and benchmark</li> </ul>
<b>Interventions / differentiated instruction</b>	<ul style="list-style-type: none"> <li>• Students given handouts of power point notes</li> <li>• Students given access to online textbook</li> <li>• Partners or group work (groups formed heterogeneously according to ability)</li> </ul>	
<b>Inter-disciplinary Connections</b>	<ul style="list-style-type: none"> <li>• Using biology to help sketch graphs of functions</li> </ul>	
<b>Lesson resources / Activities</b>	<ul style="list-style-type: none"> <li>• Holt McDougal Algebra I , copyright 2007 – Chapter 4</li> <li>• Power point resources</li> <li>• Textbook practice worksheet</li> <li>• Online textbook (<a href="http://www.hrw.com">www.hrw.com</a>)</li> </ul>	
<b>Common Core State Standards</b>		
<b>Grade or Conceptual Category (HS only): Algebra I</b>		
<b>Domain (name and #):</b> Quantities; Creating Equations; Reasoning with Equations and Inequalities; Interpreting Functions, Linear, Quadratic, and exponential models; Interpreting Categorical and Quantitative data		
<b>Cluster: Reason quantitatively and use units to solve problems. Create equations that describe numbers or relationships Represent and equations and inequalities graphically Understand the concept of a function and use function notation Construct and compare</b>	<b>#. Standard:</b>	
	N-Q-1, A-CED-1, A-CED-2, A-CED-3, A-REI-3, A-REI-10, F-IF-1, F-IF-2, F-IF-4, F-IF-5, F-IF-7, F-BF-1,	

**linear, quadratic, and exponential models and solve problems**  
**Summarize, represent, and interpret data on two categorical and quantitative variables**

**Math Practices: Make sense of problems and persevere in solving them, model with mathematics, use appropriate tools strategically**

**21<sup>st</sup> Century Themes**

X	Global Awareness	X	Financial, Economic, Business, and Entrepreneurial Literacy		Civic Literacy		Health Literacy
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**21<sup>st</sup> Century Skills**

	Creativity and Innovation	X	Critical Thinking and Problem Solving	X	Communication and Collaboration		Information Literacy
	Media Literacy		ICT Literacy	X	Life and Career Skills		

<b>Unit Title: Linear Functions</b>		<b>Unit #: 3</b>
<b>Course or Grade Level: Algebra I</b>		<b>Length of Time: 18 days</b> (2 days per section, 2 review days and 2 summative assessment days)
<b>Pacing</b>	October/November	
<b>Essential Questions</b>	<ul style="list-style-type: none"> <li>• What are two different ways to determine if a function is a linear function?</li> <li>• How do you determine if it is useful to write a linear equation in slope-intercept form or point-slope form?</li> <li>• How do you determine if a pair of lines is parallel or perpendicular?</li> <li>• What is the difference between a pair of lines that are parallel and a pair of lines that are perpendicular?</li> </ul>	
<b>Content</b>	<ul style="list-style-type: none"> <li>• Identifying Linear Functions (5-1)</li> <li>• Using Intercepts (5-2)</li> <li>• The Slope Formula (5-4)</li> <li>• Slope-Intercept Form (5-6)</li> <li>• Point-Slope Form (5-7)</li> <li>• Scatter Plots and Trend Lines by use of Graphing Calculator (4-5)</li> <li>• Slopes of Parallel and Perpendicular Lines (5-8)</li> </ul>	
<b>Skills</b>	<ul style="list-style-type: none"> <li>• Identify linear functions from a graph and/or ordered pairs</li> <li>• Graph linear functions</li> <li>• Identify intercepts</li> <li>• Determine the slope of a line</li> <li>• Write linear equations in slope-intercept and point-slope form</li> <li>• Describe correlations from scatter plots</li> <li>• Use a trend line to make predictions from data</li> <li>• Identify a pair of lines as parallel or perpendicular</li> </ul>	
<b>Assessments</b>	Formative: <ul style="list-style-type: none"> <li>• Teacher observation and questioning</li> <li>• Seat and or group work</li> <li>• Fist to five/ Thumbs up, thumbs down</li> <li>• Homework</li> <li>• Student participation at board</li> </ul>	Summative: <ul style="list-style-type: none"> <li>• Quizzes, tests and benchmark</li> </ul>
<b>Interventions / differentiated instruction</b>	<ul style="list-style-type: none"> <li>• Students given handouts of power point notes</li> <li>• Students given access to online textbook</li> <li>• Partners or group work (groups formed heterogeneously according to ability)</li> </ul>	
<b>Inter-disciplinary Connections</b>	<ul style="list-style-type: none"> <li>• Use finance to determine the domain and range of functions</li> <li>• Use finance to determine the rate of change in cost over a period of time</li> </ul>	
<b>Lesson resources / Activities</b>	<ul style="list-style-type: none"> <li>• Holt McDougal Algebra I , copyright 2007 – Chapter 5</li> <li>• Power point resources</li> <li>• Textbook practice worksheet</li> <li>• Online textbook (<a href="http://www.hrw.com">www.hrw.com</a>)</li> </ul>	
<b>Common Core State Standards</b>		
<b>Grade or Conceptual Category (HS only): Algebra I</b>		
<b>Domain (name and #):</b> Creating Equations; Reasoning with Equations and Inequalities; Interpreting Functions; Building Functions; Linear, Quadratic, and exponential models; Interpreting Categorical and Quantitative data.		
<b>Cluster: Creating equations that describe numbers or relationships Represent and solve equations and</b>	<b>#. Standard:</b>	
	N-Q-1, A-CED-2, A-CED-3, A-REI-3, F-IF-4, F-IF-5, F-IF-6, F-IF-7, F-IF-9, F-BF-1, F-LE-2, F-LE-5, S-ID-6	

**inequalities graphically. Analyze functions using different representations. Build a function that models a relationship between two quantities. Construct and compare linear, quadratic, and exponential models and solve problems. Interpret expressions for functions in terms of the situation they model. Interpret linear models.**

**Math Practices: Make sense of problems and persevere in solving them, Construct viable arguments and critique the reasoning of others, Model with mathematics, Use appropriate tools strategically, Attend to precision, Look for and express regularity in repeated reasoning**

**21<sup>st</sup> Century Themes**

X	Global Awareness		Financial, Economic, Business, and Entrepreneurial Literacy		Civic Literacy		Health Literacy
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**21<sup>st</sup> Century Skills**

	Creativity and Innovation	X	Critical Thinking and Problem Solving	X	Communication and Collaboration		Information Literacy
	Media Literacy		ICT Literacy	X	Life and Career Skills		

<b>Unit Title: Systems of Equations and Inequalities</b>		<b>Unit #: 4</b>
<b>Course or Grade Level: Algebra I</b>		<b>Length of Time: 20 days</b> (2 days per section, 2 review days and 2 summative assessment days)
<b>Date Created: 8/5/14</b>		<b>BOE Approval Date:</b>
<b>Pacing</b>	November/December	
<b>Essential Questions</b>	<ul style="list-style-type: none"> <li>• What is the difference between a system of equations and a linear function?</li> <li>• How can you determine the best method to solve a system of equations?</li> <li>• How do you determine if a system is classified as a special system?</li> </ul>	
<b>Content</b>	<ul style="list-style-type: none"> <li>• Solving Systems by Graphing (6-1)</li> <li>• Solving Systems by Substitution (6-2)</li> <li>• Solving Systems by Elimination (6-3)</li> <li>• Solving Special Systems (6-4)</li> <li>• Solving Linear Inequalities (6-5)</li> <li>• Solving Systems of Linear Inequalities (6-6)</li> </ul>	
<b>Skills</b>	<ul style="list-style-type: none"> <li>• Graph a system of linear equations to find a solution</li> <li>• Determine the solution of a system by substitution</li> <li>• Determine the solution of a system by elimination</li> <li>• Classify a special system as consistent or inconsistent</li> <li>• Classify a special system by the number of solutions</li> </ul>	
<b>Assessments</b>	<b>Formative:</b> <ul style="list-style-type: none"> <li>• Teacher observation and questioning</li> <li>• Seat and or group work</li> <li>• Fist to five/ Thumbs up, thumbs down</li> <li>• Homework</li> <li>• Student participation at board</li> </ul>	<b>Summative:</b> <ul style="list-style-type: none"> <li>• Quizzes, tests and benchmark</li> </ul>
<b>Interventions / differentiated instruction</b>	<ul style="list-style-type: none"> <li>• Students given handouts of power point notes</li> <li>• Students given access to online textbook</li> <li>• Partners or group work (groups formed heterogeneously according to ability)</li> </ul>	
<b>Inter-disciplinary Connections</b>	<ul style="list-style-type: none"> <li>• Use finance to determine the solution of a system of equation.</li> <li>• Use geometry to determine the degree measurement of <math>x</math> and <math>y</math> by solving a system of equations.</li> </ul>	
<b>Lesson resources / Activities</b>	<ul style="list-style-type: none"> <li>• Holt McDougal Algebra I , copyright 2007 – Chapter 6</li> <li>• Power point resources</li> <li>• Textbook practice worksheet</li> <li>• Online textbook (<a href="http://www.hrw.com">www.hrw.com</a>)</li> </ul>	
<b>Common Core State Standards</b>		
<b>Grade or Conceptual Category (HS only): Algebra I</b>		
<b>Domain (name and #):</b> Creating Equations; Reasoning with Equations and Inequalities; Interpreting Functions; Building Functions; Linear, Quadratic, and Exponential Models.		
<b>Cluster: Creating equations that describe numbers or relationships. Solve systems of equations. Represent and solve equations and inequalities graphically. Analyze functions using</b>	<b>#. Standard:</b>	
	A-CED-2, A-CED-3, A-REI-3, A-REI-6, A-REI-12,	



<p><b>different representations. Build a function that models a relationship between two quantities. Construct and compare linear, quadratic, and exponential models and solve problems.</b></p>	
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**Math Practices: Make sense of problems and persevere in solving them, Reason abstractly and quantitatively, Construct viable arguments and critique the reasoning of others, Use appropriate tools strategically, Attend to precision.**

**21<sup>st</sup> Century Themes**

X	Global Awareness		Financial, Economic, Business, and Entrepreneurial Literacy		Civic Literacy		Health Literacy
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**21<sup>st</sup> Century Skills**

	Creativity and Innovation	X	Critical Thinking and Problem Solving	X	Communication and Collaboration		Information Literacy
	Media Literacy		ICT Literacy	X	Life and Career Skills		

**Pine Hill Public Schools  
Mathematics Curriculum**

<b>Unit Title: Exponents and Polynomials</b>		<b>Unit #: 5</b>
<b>Course or Grade Level: Algebra I</b>		<b>Length of Time: 17 days</b> (2 days per section, 2 review days and 2 summative assessment days)
<b>Pacing</b>	December/January	
<b>Essential Questions</b>	<ul style="list-style-type: none"> <li>• What is the difference between scientific notation and standard notation?</li> <li>• Why can an exponent never be negative?</li> <li>• When combining like terms why doesn't the value of the exponent change?</li> <li>• What is the difference between multiplying and dividing numerical bases containing exponents and variable bases?</li> <li>• How do you determine if a polynomial is a perfect square trinomial or a difference of squares?</li> <li>• What are the steps to multiply polynomials by the use of FOIL and the box method?</li> </ul>	
<b>Content</b>	<ul style="list-style-type: none"> <li>• Integer exponents (7-1)</li> <li>• Review Multiplication and Division Properties of Exponents (7-3/7-4)</li> <li>• Polynomials (7-5)</li> <li>• Adding and subtracting polynomials (7-6)</li> <li>• Multiplying polynomials (7-7)</li> <li>• Special products of binomials (7-8)</li> </ul>	
<b>Skills</b>	<ul style="list-style-type: none"> <li>• Evaluate integer exponents, rewrite negative exponents as positive</li> <li>• Express numbers in standard and scientific notation</li> <li>• Simplify algebraic expressions by exponent properties</li> <li>• Identify polynomials and express them in standard form</li> <li>• Add and subtract polynomials by combining like terms</li> <li>• Multiply polynomials by FOIL or box method</li> <li>• Determine a binomial as a perfect square trinomial or a difference of squares</li> </ul>	
<b>Assessments</b>	Formative: <ul style="list-style-type: none"> <li>• Teacher observation and questioning</li> <li>• Seat and or group work</li> <li>• Fist to five/ Thumbs up, thumbs down</li> <li>• Homework</li> <li>• Student participation at board</li> </ul>	Summative: <ul style="list-style-type: none"> <li>• Quizzes, tests and benchmark</li> </ul>
<b>Interventions / differentiated instruction</b>	<ul style="list-style-type: none"> <li>• Students given handouts of power point notes</li> <li>• Students given access to online textbook</li> <li>• Partners or group work (groups formed heterogeneously according to ability)</li> </ul>	
<b>Inter-disciplinary Connections</b>	<ul style="list-style-type: none"> <li>• Use finance to add and subtract polynomial profits of two different industries.</li> <li>• Use photography to determine the area of photograph by multiplying binomials.</li> </ul>	
<b>Lesson resources / Activities</b>	<ul style="list-style-type: none"> <li>• Holt McDougal Algebra I , copyright 2007 – Chapter 7</li> <li>• Power point resources</li> <li>• Textbook practice worksheet</li> <li>• Online textbook (<a href="http://www.hrw.com">www.hrw.com</a>)</li> </ul>	
<b>Common Core State Standards</b>		
<b>Grade or Conceptual Category (HS only): Algebra I</b>		
<b>Domain (name and #):</b> The Real Number System; Seeing Structure in Expressions; Arithmetic with Polynomials and Rational Expressions.		
<b>Cluster: Extend the properties of exponents to</b>	<b>#. Standard:</b>	
	N-RN-1, A-APR-1, A-APR-4, A-REI-3, F-IF-2, G-MG-1	

<b>rational exponents.          Interpret the structure of expressions.          Write expressions in equivalent forms to solve problems.          Perform arithmetic operations on polynomials.</b>							
<b>Math Practices: Make sense of problems and persevere in solving them, Construct viable arguments and critique the reasoning of others, Model with mathematics, Attend to precision, Look for and make sure of structure, Look for and express regularity in repeated reasoning.</b>							
<u><b>21<sup>st</sup> Century Themes</b></u>							
X	Global Awareness		Financial, Economic, Business, and Entrepreneurial Literacy		Civic Literacy		Health Literacy
<u><b>21<sup>st</sup> Century Skills</b></u>							
	Creativity and Innovation	X	Critical Thinking and Problem Solving	X	Communication and Collaboration		Information Literacy
	Media Literacy		ICT Literacy		Life and Career Skills		

**Pine Hill Public Schools  
Mathematics Curriculum**

<b>Unit Title: Factoring Polynomials</b>		<b>Unit #: 6</b>
<b>Course or Grade Level: Algebra I</b>		<b>Length of Time: 18 days</b> (2 days per section, 2 review days and 2 summative assessment days)
<b>Pacing</b>	January/February	
<b>Essential Questions</b>	<ul style="list-style-type: none"> <li>• How does the GCF between a number and a variable differ?</li> <li>• What is the difference between factoring a polynomial in the form <math>x^2 + bx + c</math> compared to <math>ax^2 + bx + c</math>?</li> <li>• What are the properties to determine if a polynomial is a perfect square trinomial or a difference of squares?</li> <li>• What are signs of identification to help determine the appropriate factoring method?</li> </ul>	
<b>Content</b>	<ul style="list-style-type: none"> <li>• Factoring by GCF (8-2)</li> <li>• Factoring <math>x^2 + bx + c</math> (8-3)</li> <li>• Factoring <math>ax^2 + bx + c</math> (8-4)</li> <li>• Factoring special products (8-5)</li> <li>• Choosing a factoring method (8-6)</li> </ul>	
<b>Skills</b>	<ul style="list-style-type: none"> <li>• Identify the GCF between a set of monomials</li> <li>• Factor of the GCF from a polynomial to express as a distributive expression</li> <li>• Factor a trinomial into a multiplication of binomials</li> <li>• Determine if a trinomial is a perfect square trinomial by use of square roots</li> <li>• Determine if a binomial difference is a difference of squares by use of square roots</li> <li>• Determine the appropriate factoring method to difference forms of polynomials</li> </ul>	
<b>Assessments</b>	Formative: <ul style="list-style-type: none"> <li>• Teacher observation and questioning</li> <li>• Seat and or group work</li> <li>• Fist to five/ Thumbs up, thumbs down</li> <li>• Homework</li> <li>• Student participation at board</li> </ul>	Summative: <ul style="list-style-type: none"> <li>• Quizzes, tests and benchmark</li> </ul>
<b>Interventions / differentiated instruction</b>	<ul style="list-style-type: none"> <li>• Students given handouts of power point notes</li> <li>• Students given access to online textbook</li> <li>• Partners or group work (groups formed heterogeneously according to ability)</li> </ul>	
<b>Inter-disciplinary Connections</b>	<ul style="list-style-type: none"> <li>• Use finance to determine the domain and range of functions</li> <li>• Use finance to determine the rate of change in cost over a period of time</li> </ul>	
<b>Lesson resources / Activities</b>	<ul style="list-style-type: none"> <li>• Holt McDougal Algebra I , copyright 2007 – Chapter 8</li> <li>• Power point resources</li> <li>• Textbook practice worksheet</li> <li>• Online textbook (<a href="http://www.hrw.com">www.hrw.com</a>)</li> </ul>	
<b>Common Core State Standards</b>		
<b>Grade or Conceptual Category (HS only): Algebra I</b>		
<b>Domain (name and #):</b> Quantities; Seeing Structure in Expression.		
<b>Math Practices: Make sense of problems and persevere in solving them, Reason abstractly and quantitatively, Construct viable arguments and critique the reasoning of others, Model with mathematics, Use appropriate tools strategically, Attend to precision, Look for and make use of structure, Look for and express regularity in repeated reasoning.</b>		

**21<sup>st</sup> Century Themes**

X	Global Awareness		Financial, Economic, Business, and Entrepreneurial Literacy		Civic Literacy		Health Literacy
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**21<sup>st</sup> Century Skills**

	Creativity and Innovation	X	Critical Thinking and Problem Solving	X	Communication and Collaboration		Information Literacy
	Media Literacy		ICT Literacy		Life and Career Skills		

**Pine Hill Public Schools  
Mathematics Curriculum**

**Unit Title: Quadratic Functions and Equations**

**Unit #: 7**

**Course or Grade Level: Algebra I**

**Length of Time: 18 days** (2 days per section, 2 review days and 2 summative assessment days)

**Pacing**

February/March

**Essential Questions**

- How does the graph differ from a linear function to a quadratic function?
- What determines if a quadratic equation has a maximum or minimum?
- What are the steps to graph a quadratic function using its axis of symmetry, vertex, and y-intercept?
- What is the difference between having  $a > 1$  and  $a < 1$ , and what is its effect on a quadratic function?
- What are the zeros of a quadratic function?
- What are the steps to determine the zeros of a quadratic function by the use of the zero product property?
- What are the steps to determine the zeros of a quadratic function by the use of square roots?
- What is the difference between determining the zeros of a quadratic function by factoring and use of square roots?

**Content**

- Identifying Quadratic Functions (9-1)
- Characteristics of Quadratics Functions (9-2)
- Graphing Quadratic Functions (9-3)
- Transforming Quadratic Functions (9-4)
- Solving Quadratic Functions by Graphing (9-5)
- Solving Quadratic Equations by Factoring (9-6)
- Solving Quadratic Equations by Using Square Roots (9-7)

**Skills**

- Identify an equation quadratic by having a degree of two
- Determine the axis of symmetry and vertex of a quadratic function by its graph
- Determine the axis of symmetry and vertex of a quadratic function by its equation
- Determine the maximum and minimum of a quadratic function
- Graph a quadratic function by determining the axis of symmetry, vertex, and y-intercept
- Identify the transformation of a quadratic function to its parent function  $f(x) = x^2$
- Determine the zeros of a quadratic function by factoring and the zero product property
- Determine the zeros of a quadratic function by the use of square roots

**Assessments**

- |   |  |
|---|--|
| <p>Formative:</p> <ul style="list-style-type: none"> <li>• Teacher observation and questioning</li> <li>• Seat and or group work</li> <li>• Fist to five/ Thumbs up, thumbs down</li> <li>• Homework</li> <li>• Student participation at board</li> </ul> | <p>Summative:</p> <ul style="list-style-type: none"> <li>• Quizzes, tests and benchmark</li> </ul> |
|---|--|

**Interventions / differentiated instruction**

- Students given handouts of power point notes
- Students given access to online textbook
- Partners or group work (groups formed heterogeneously according to ability)

**Inter-disciplinary Connections**

- Use knowledge of architecture to determine if the height of a boat can pass under the arch of a bridge.
- Use physics to determine the velocity of a water flow in a pipe and if it varies according to the circumference in the pipe.
- Use physics to compare the graphs of falling objects from two different heights and the length it takes to reach the ground.

**Lesson resources / Activities**

- Holt McDougal Algebra I , copyright 2007 – Chapter 9
- Power point resources
- Textbook practice worksheet
- Online textbook ([www.hrw.com](http://www.hrw.com))

**Common Core State Standards**

**Grade or Conceptual Category (HS only): Algebra I**

**Domain (name and #):** Quantities; Seeing Structure in Expressions; Reasoning with Equations and Inequalities; Interpreting Functions; Building Functions.

<b>Cluster: Reason quantitatively and use units to solve problems. Write expressions in equivalent forms to solve problems. Solve equations and inequalities in one variable. Analyze functions using different representations. Build new functions from existing functions.</b>	<b>#. Standard:</b>
	N-Q-1, A-SSE-3, A-APR-4, A-CED-1, A-CED-2, A-CED-3, A-REI-4, A-REI-11, F-IF-4, F-IF-5, F-IF-7, F-IF-9, F-BF-1, F-BF-3

**Math Practices:** Make sense of problems and persevere in solving them, Reason abstractly and quantitatively, Construct viable arguments and critique the reasoning of others, Model with mathematics, Use appropriate tools strategically, Attend to precision, Look for and make use of structure.

[21<sup>st</sup> Century Themes](#)

X	Global Awareness		Financial, Economic, Business, and Entrepreneurial Literacy		Civic Literacy		Health Literacy
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[21<sup>st</sup> Century Skills](#)

	Creativity and Innovation	X	Critical Thinking and Problem Solving	X	Communication and Collaboration		Information Literacy
	Media Literacy		ICT Literacy		Life and Career Skills		

**Pine Hill Public Schools  
Mathematics Curriculum**

<b>Unit Title: Data Analysis and Probability</b>		<b>Unit #: 8</b>
<b>Course or Grade Level: Algebra I</b>		<b>Length of Time: 14 days</b> (2 days per section, 2 review days and 2 summative assessment days)
<b>Pacing</b>	March/April	
<b>Essential Questions</b>	<ul style="list-style-type: none"> <li>• How can you determine the best visual representation for given data?</li> <li>• What are some factors that cause a graph to be misleading?</li> <li>• What is the difference between experimental and theoretical probability?</li> <li>• What is the difference between an independent and dependent event?</li> <li>• When determining the probability of a dependent event, what is affected if an object in the event is not replaced?</li> <li>• What is the difference between a combination and a permutation, and what characteristics help determine the correct principle needed to find the solution?</li> </ul>	
<b>Content</b>	<ul style="list-style-type: none"> <li>• Experimental Probability (10-5)</li> <li>• Theoretical Probability (10-6)</li> <li>• Independent and Dependent Events (10-7)</li> <li>• Combinations and Permutations (10-8)</li> <li>• Organizing and Displaying Data by use of Graphing Calculator (10-1)</li> </ul>	
<b>Skills</b>	<ul style="list-style-type: none"> <li>• Read and interpret bar graphs, line graphs, circle graphs</li> <li>• Determine the experimental probability of a given event</li> <li>• Determine the theoretical probability of a given event</li> <li>• Determine the outcome of an independent event</li> <li>• Determine the outcome of a dependent event</li> <li>• Determine the number of outcomes using the fundamental counting principle</li> <li>• Determine the number of outcomes of combinations and permutations</li> </ul>	
<b>Assessments</b>	Formative: <ul style="list-style-type: none"> <li>• Teacher observation and questioning</li> <li>• Seat and or group work</li> <li>• Fist to five/ Thumbs up, thumbs down</li> <li>• Homework</li> <li>• Student participation at board</li> </ul>	Summative: <ul style="list-style-type: none"> <li>• Quizzes, tests and benchmark</li> </ul>
<b>Interventions / differentiated instruction</b>	<ul style="list-style-type: none"> <li>• Students given handouts of power point notes</li> <li>• Students given access to online textbook</li> <li>• Partners or group work (groups formed heterogeneously according to ability)</li> </ul>	
<b>Inter-disciplinary Connections</b>	<ul style="list-style-type: none"> <li>• Use history in developing the population of different cultural minorities by the use of graphical representations.</li> <li>• Use finance to determine the central tendency of a display of data.</li> <li>• Use history to determine the total number of outcomes in the NANP by the use of permutations.</li> </ul>	
<b>Lesson resources / Activities</b>	<ul style="list-style-type: none"> <li>• Holt McDougal Algebra I , copyright 2007 – Chapter 10</li> <li>• Power point resources</li> <li>• Textbook practice worksheet</li> <li>• Online textbook (<a href="http://www.hrw.com">www.hrw.com</a>)</li> </ul>	
<b>Common Core State Standards</b>		
<b>Grade or Conceptual Category (HS only): Algebra I</b>		
<b>Domain (name and #):</b> Quantities; Interpreting Categorical and Quantitative Data		
<b>Cluster: Reason quantitatively and use units to solve problems.</b>	<b>#. Standard:</b>	
	A-SSE-2, A-SSE-3, F-BF-3, S-ID-1, S-CP-1, S-CP-2, S-CP-3, S-CP-5, S-CP-6, S-CP-7, S-CP-8, S-CP-9, S-MD-7	



<b>Summarize, repeat, and interpret data on a single count or measureable variable.</b> <b>Summarize, represent, and interpret data on two categorical and quantitative variables.</b>							
<b>Math Practices: Make sense of problems and persevere in solving them, Reason abstractly and quantitatively, Construct viable arguments and critique the reasoning of others, Model with mathematics, Use appropriate tools strategically, Attend to precision, Look for and make use of structure.</b>							
<u><b>21<sup>st</sup> Century Themes</b></u>							
X	Global Awareness		Financial, Economic, Business, and Entrepreneurial Literacy		Civic Literacy		Health Literacy
<u><b>21<sup>st</sup> Century Skills</b></u>							
	Creativity and Innovation	X	Critical Thinking and Problem Solving	X	Communication and Collaboration		Information Literacy
	Media Literacy		ICT Literacy		Life and Career Skills		

**Pine Hill Public Schools  
Mathematics Curriculum**

<b>Unit Title: Exponential and Radical Functions</b>		<b>Unit #: 9</b>
<b>Course or Grade Level: Algebra I</b>		<b>Length of Time: 10 days</b> (2 days per section, 1 review days and 1 summative assessment days)
<b>Pacing</b>	April/May	
<b>Essential Questions</b>	<ul style="list-style-type: none"> <li>• What is the difference between a geometric sequence and an arithmetic sequence?</li> <li>• What is the difference between the graph of a linear, quadratic, and exponential function?</li> <li>• What is the difference between exponential growths when compared to exponential decays?</li> <li>• What real world situations would best compare with exponential growths and exponential decays?</li> </ul>	
<b>Content</b>	<ul style="list-style-type: none"> <li>• Arithmetic and Geometric Sequences (4-6/11-1)</li> <li>• Exponential Functions (11-2)</li> <li>• Exponential Growth and Decay (11-3)</li> <li>• Linear, Quadratic, and Exponential Models (11-4)</li> </ul>	
<b>Skills</b>	<ul style="list-style-type: none"> <li>• Extend and find the <i>n</i>th of a Arithmetic and Geometric Sequence</li> <li>• Identify and evaluate an Exponential Function</li> <li>• Graph an Exponential Function by use of a table</li> <li>• Determine the exponential growth and decay of functions</li> <li>• Graph data to determine if a model is linear, quadratic, or exponential</li> </ul>	
<b>Assessments</b>	Formative: <ul style="list-style-type: none"> <li>• Teacher observation and questioning</li> <li>• Seat and or group work</li> <li>• Fist to five/ Thumbs up, thumbs down</li> <li>• Homework</li> <li>• Student participation at board</li> </ul>	Summative: <ul style="list-style-type: none"> <li>• Quizzes, tests and benchmark</li> </ul>
<b>Interventions / differentiated instruction</b>	<ul style="list-style-type: none"> <li>• Students given handouts of power point notes</li> <li>• Students given assess to online textbook</li> <li>• Partners or group work (groups formed heterogeneously according to ability)</li> </ul>	
<b>Inter-disciplinary Connections</b>	<ul style="list-style-type: none"> <li>• Use history in determining if the population is an exponential growth or decay through centuries.</li> <li>• Use finance to determine the exponential effect of the compound interest function.</li> <li>• Use science to determine measurements remaining after a certain period of time by the use of the half-life formula.</li> </ul>	
<b>Lesson resources / Activities</b>	<ul style="list-style-type: none"> <li>• Holt McDougal Algebra I , copyright 2007 – Chapter 11</li> <li>• Power point resources</li> <li>• Textbook practice worksheet</li> <li>• Online textbook (<a href="http://www.hrw.com">www.hrw.com</a>)</li> </ul>	
<b>Common Core State Standards</b>		
<b>Grade or Conceptual Category (HS only): Algebra I</b>		
<b>Domain (name and #):</b> Quantities; Seeing Structure in Expressions; Build Functions; Linear, Quadratic, and Exponential Models.		
<b>Cluster: Reason quantitatively and use units to solve problems. Write expressions in equivalent forms to solve problems. Build a function that models a relationship between two quantities. Construct and compare</b>	<b>#. Standard:</b>	
	N-Q-1, A-SSE-3, A-CED-1, A-CED-2, A-CED-3, A-REI-3, A-REI-4, F-IF-2, F-IF-4, F-IF-7, F-IF-9, F-BF-1, F-BF-2, F-LE-1, F-LE-2, F-LE-3, F-LE-5, S-MD-7	

<b>linear, quadratic, and exponential models and solve problems. Interpret expressions for functions in terms of the situation they model.</b>	
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**Math Practices: Make sense of problems and persevere in solving them, Reason abstractly and quantitatively, Construct viable arguments and critique the reasoning of others, Model with mathematics, Use appropriate tools strategically, Attend to precision, Look for and make use of structure.**

**21<sup>st</sup> Century Themes**

X	Global Awareness		Financial, Economic, Business, and Entrepreneurial Literacy		Civic Literacy		Health Literacy
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**21<sup>st</sup> Century Skills**

	Creativity and Innovation	X	Critical Thinking and Problem Solving	X	Communication and Collaboration		Information Literacy
	Media Literacy		ICT Literacy		Life and Career Skills		

**Pine Hill Public Schools  
Mathematics Curriculum**

<b>Unit Title: Rational Functions and Equations</b>		<b>Unit #: 10</b>
<b>Course or Grade Level: Algebra I</b>		<b>Length of Time: 20 days</b> (2 days per section, 2 review days and 2 summative assessment days)
<b>Pacing</b>	May/June	
<b>Essential Questions</b>	<ul style="list-style-type: none"> <li>• Can two quantities be inversely proportional if an increase in one corresponds to a decrease in the other?</li> <li>• What kinds of asymptotes are possible for a rational function?</li> <li>• Are a rational expression and its simplified form equivalent?</li> </ul>	
<b>Content</b>	<ul style="list-style-type: none"> <li>• Inverse Functions (12-1)</li> <li>• Rational Functions (12-2)</li> <li>• Simplifying Rational Functions (12-3)</li> <li>• Multiplying and Dividing Rational Expressions (12-4)</li> <li>• Adding and Subtracting Rational Expressions (12-5)</li> <li>• Dividing Polynomials (12-6)</li> <li>• Solving Rational Equations (12-7)</li> </ul>	
<b>Skills</b>	<ul style="list-style-type: none"> <li>• Identify and Graph Inverse Variations</li> <li>• Identify and Graph Rational Functions by excluded values and asymptotes</li> <li>• Simplify Rational Expressions by the use of Factoring, and determining undefined values</li> <li>• Multiplying and Dividing Rational Expressions by Factoring and Exponent Properties</li> <li>• Adding and Subtracting Rational Expressions with like denominators and determining the LCD for unlike denominators</li> <li>• Dividing Polynomials by Long Division and Synthetic Division</li> <li>• Solving Rational Equations by using Cross Products and the LCD to determine if there are an Extraneous Solutions</li> </ul>	
<b>Assessments</b>	Formative: <ul style="list-style-type: none"> <li>• Teacher observation and questioning</li> <li>• Seat and or group work</li> <li>• Fist to five/ Thumbs up, thumbs down</li> <li>• Homework</li> <li>• Student participation at board</li> </ul>	Summative: <ul style="list-style-type: none"> <li>• Quizzes, tests and benchmark</li> </ul>
<b>Interventions / differentiated instruction</b>	<ul style="list-style-type: none"> <li>• Students given handouts of power point notes</li> <li>• Students given access to online textbook</li> <li>• Partners or group work (groups formed heterogeneously according to ability)</li> </ul>	
<b>Inter-disciplinary Connections</b>	<ul style="list-style-type: none"> <li>• Use physics and the product rule to determine the pressure in an air pump by inverse variation.</li> <li>• Use biology to determine the surface-area-to-volume ratio of plants by simplifying rational expressions.</li> <li>• Use statistics to determine the probability of a dependent event involving rational expressions to define a sample space.</li> </ul>	
<b>Lesson resources / Activities</b>	<ul style="list-style-type: none"> <li>• Holt McDougal Algebra I , copyright 2007 – Chapter 12</li> <li>• Power point resources</li> <li>• Textbook practice worksheet</li> <li>• Online textbook (<a href="http://www.hrw.com">www.hrw.com</a>)</li> </ul>	
<b>Common Core State Standards</b>		
<b>Grade or Conceptual Category (HS only): Algebra I</b>		
<b>Domain (name and #):</b> Arithmetic with Polynomials and Rational Expressions, Creating Equations, Reasoning with Equations and Inequalities, Interpreting Functions, Building Functions		
<b>Cluster: Rewrite simple rational expressions in different forms.</b>	<b>#. Standard:</b>	
	A-APR-6, A-APR-7, A-CED-2, A-CED-3, A-REI-2, A-REI-3, A-REI-4, F-IF-5, F-IF-7, F-IF-9, F-BF-3	

<b>Solve and graph simple rational and radical equations and inequalities.</b> <b>Understand rational function models and there graphs.</b> <b>Effects of graphs using technology.</b>	

**Math Practices: Make sense of problems and persevere in solving them, Reason abstractly and quantitatively, Construct viable arguments and critique the reasoning of others, Model with mathematics, Use appropriate tools strategically, Attend to precision, Look for and make use of structure.**

21<sup>st</sup> Century Themes

X	Global Awareness	X	Financial, Economic, Business, and Entrepreneurial Literacy		Civic Literacy		
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21<sup>st</sup> Century Skills

	Creativity and Innovation	X	Critical Thinking and Problem Solving	X	Communication and Collaboration		
	Media Literacy		ICT Literacy	X	Life and Career Skills		

Revised: August 26, 2014