Original Adoption:	School Year 2017-2018
Revised On:	July / August 2019
Board Approved:	August 21, 2019

MIddle School Algebra Curriculum Documents

TIME PERIOD	UNIT	STANDARDS & KEY CONCEPTS
Beg of September (Days 1-10)	Pre-Algebra Review	● Reviews standards A.CED.1, A.CED.2, A.CED.3, A.CED.4, A.REI.1, A.REI.3, A.REI.10, F.IF.4, & F.IF.6, all of which are included in the appropriate units below.
End of September through October (Days 11-40)	Unit 1 - Equations and Inequalities	● A.REI.A.1 ○ WALT justify each step in solving an equation as a property of equality from the previous step ○ WALT construct a viable argument to justify a solution method. ● A.REI.A.2 ○ WALT solve simple rational equations in one variable ○ WALT show how extraneous solutions may arise in simple rational equations in one variable by giving examples. ● A.REI.B.3 ○ WALT solve linear equations in one variable, including equations with coefficients represented by letters. ○ WALT solve linear inequalities in one variable. ● A.CED.A.4 ○ WALT rearrange formulas for a specific variable using the same reasoning as solving linear equations ● A.CED.A.1 ○ WALT create equations in one variable and use them to solve problems. ○ WALT create inequalities in one variable and use them to solve problems.

November (Days 41-54)	Unit 2 - Graphing Linear Equations & Inequalities	● A.REI.D.10 ○ WALT the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line). ● F.LE.A.1.b ○ WALT recognize situations in which one quantity changes at a constant rate per unit interval relative to another. ● F.IF.B.6 ○ WALT calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. ○ WALT estimate the rate of change from a graph. ● F.LE.A.2 ○ WALT construct linear functions given a graph, a description of a relationship, or two input-output pairs (include reading these from a table). ● A.CED.A.2 ○ WALT create equations in two or more variables to represent relationships between quantities. ○ WALT graph equations on coordinate axes with labels and scales. ● F.LE.B.5 ○ WALT interpret the parameters in a linear function in terms of a context. ● F.IF.C.9 ○ WALT compare the properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). ● S.ID.B.6a ○ WALT represent data on two quantitative variables on a scatter plot, and describe how the variables are related. ○ WALT fit a function to the data using a line of best fit. ○ WALT use functions fitted to data to solve problems in the context of the data. ● S.ID.C.7 ○ WALT interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data. ● S.ID.C.8 ○ WALT compute (using technology) and interpret the correlation coefficient of a linear fit. ● A.REI.D.12 ○ WALT graph the solutions to a linear inequality in two variables as a half plane (excluding the boundary in the case of a strict inequality) ● A.CED.A.3 ○ WALT represent constraints by equations or inequalities, and interpret solutions as viable or nonviable options in a modeling context.
End-	Unit 3 -	● A.REI.C.6

November (Days 55-65)	Systems of Linear Equations & Inequalities	○ WALT solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables. ● A.REI.C.5 ○ WALT prove that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a multiple of the other produces a system with the same solutions. ● A.CED.A.3 ○ WALT represent constraints by systems of equations and/or inequalities ○ WALT interpret solutions as viable or nonviable options in a modeling context. ● A.REI.D.11 ○ WALT explain why the x-coordinates of the points where the graphs of the equations $y = f(x)$ and $y = g(x)$ intersect are the solutions of the equation $f(x) = g(x)$. ○ WALT find the solutions approximately, e.g., using technology to graph the functions or make tables of values ● A.REI.D.12 ○ WALT graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes

December (Days 66-75)	Unit 4 - Functions	● F.IF.A.1 ○ WALT understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. ○ WALT if f is a function and x is an element of its domain, then $f(x)$ denotes the output of f corresponding to the input x. ○ WALT the graph of f is the graph of the equation $y = f(x)$. ● F.IF.A.2 ○ WALT use function notation. ○ WALT evaluate functions for inputs in the domains. ○ WALT interpret statements that use function notation in terms of a context. ● F.IF.B.5 ○ WALT relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. For example, if the function $h(n)$ gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function. ● F.IF.C.7.b ○ WALT graph piecewise-defined functions, including step functions and absolute value functions. ● F.IF.B.4 ○ WALT for a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities. ○ WALT sketch graphs showing key features given a verbal description of the relationship. ○ WALT key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior ● F.BF.B.3 ○ WALT identify the effect on the graph of replacing $f(x)$ by $f(x) + k, kf(x), f(kx), and\ f(x + k)$ for specific values of k (both positive and negative). ○ WALT find the value of k in the above scenarios given graphs. ● F.IF.A.3 ○ WALT recognize that sequences are functions whose domain is a subset of the integers. ● F.BF.A.2 ○ WALT write arithmetic sequences and use them to model situations. ● F.LE.A.2 ○ WALT construct linear functions for arithmetic sequences given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).

January (Days 76 -	Unit 5 - Real Number System,	● N.RN.B.3 ○ WALT explain why the sum or product of two rational numbers is rational.

90)	Exponents, and Exponential Functions	○ WALT explain that the sum of a rational number and an irrational number is irrational. ○ WALT explain that the product of a nonzero rational number and an irrational number is irrational. ● N.RN.A.1 ○ WALT explain how the definition of the meaning of rational exponents follows from extending the properties of integer exponents to those values, allowing for a notation for radicals in terms of rational exponents. For example, $\left(5^{\frac{1}{3}}\right)$is equivalent to $\sqrt[3]{5}$ because $\left(5^{\frac{1}{3}}\right)^3 = 5\ and\ \left(\sqrt[3]{5}\right)^3 = 5.$ ● N.RN.A.2 ○ WALT rewrite expressions involving radicals and rational exponents using the properties of exponents. ● F.IF.C.7.e ○ WALT graph exponential functions, showing intercepts and end behavior ● F.LE.A.1.a ○ WALT prove that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals. ● F.LE.A.1.c ○ WALT recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another. ● F.LE.A.2 ○ WALT construct exponential functions given a graph, a description of a relationship, or two input-output pairs (include reading these from a table). ● F.LE.A.3 ○ WALT observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function. ● F.LE.B.5 ○ WALT interpret the parameters in an exponential function in terms of a context. ● A.SSE.B.3c ○ WALT use the properties of exponents to transform expressions for exponential functions. ● F.IF.C.8.b ○ WALT use the properties of exponents to interpret expressions for exponential functions. For example, identify percent rate of change in functions such as ○ $y = (1.02)^t, y = (0.97)^t, y = (1.01)^{12t}, y = (1.2)^{\frac{t}{10}}$, and classify them as representing exponential growth or decay.
February (Days 91-106)	Unit 6- Polynomials	● A.SSE.A.1a ○ WALT interpret parts of an expression, such as terms, factors, and coefficients. ● A.APR.A.1

		○ WALT understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication. ○ WALT add, subtract, and multiply polynomials. ● A.APR.C.4 ○ WALT prove polynomial identities and use them to describe numerical relationships. For example, the difference of two squares, perfect square trinomials
Beg-March (Days 107-122)	Unit 7 - Factoring	● A.APR.B.3 ○ WALT identify zeros of polynomials when suitable factorizations are available. ● A.SSE.B.3.a ○ WALT factor a quadratic expression to reveal the zeros of the function it defines. ● A.REI.B.4b ○ WALT solve quadratic equations in one variable by factoring. ● A.SSE.A.2 ○ WALT use the structure of an expression to identify ways to rewrite it. For example, see $x^4 - y^4$as $(x^2)^2 - (y^2)^2$, thus recognizing it as a difference of squares that can be factored as $(x^2 - y^2)(x^2 + y^2)$.

End of March/Beg of April (Days 123-135)	Unit 8 - Graphing Quadratic Functions	● F.IF.B.4 ○ WALT for a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities. ○ WALT sketch graphs showing key features given a verbal description of the relationship. ○ WALT key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior ● F.IF.C.7.a ○ WALT graph quadratic functions and show intercepts, maxima, and minima. ● A.APR.B.3 ○ WALT identify zeros of polynomials when suitable factorizations are available, and use the zeros to construct a rough graph of the function defined by the polynomial. ● A.SSE.B.3b ○ WALT complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines. ● F.IF.C.8.a ○ WALT 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.

		• F.IF.B.6 ○ WALT calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. ○ WALT estimate the rate of change from a graph. • F.IF.C.9 ○ WALT compare the properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). • F.BF.B.3 ○ WALT identify the effect on the graph of replacing $f(x)$ by $f(x)+k, kf(x), f(kx), and\ f(x+k)$ for specific values of k (both positive and negative). ○ WALT find the value of k in the above scenarios given graphs.
April (Days 136-151)	Unit 9 - Solving Quadratic Equations	• A.REI.B.4.a ○ WALT use the method of completing the square to transform any quadratic equation in x into an equation of the form $(x-p)^2=q$that has the same solutions. ○ WALT derive the quadratic formula from this form. • A.REI.B.4.b ○ WALT solve quadratic equations by inspection, taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. • A.REI.C.7 ○ WALT solve a simple system consisting of a linear equation and a quadratic equation in two variables algebraically and graphically. • A.REI.D.11 ○ WALT explain why the x-coordinates of the points where the graphs of the equations $y=f(x)$ and $y=g(x)$ intersect are the solutions of the equation $f(x)=g(x)$. ○ WALT find the solutions approximately, e.g., using technology to graph the functions or make tables of values

May (Days 152-167	Unit 10 - Square Root Functions & Geometry	• N.RN.A.2 ○ WALT rewrite expressions involving radicals. • A.REI.2 ○ WALT solve simple radical equations in one variable, and give examples showing how extraneous solutions may arise. • F.IF.C.7.b ○ WALT graph square root functions. • F.IF.B.4

		○ WALT for a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities. ○ WALT sketch graphs showing key features given a verbal description of the relationship. ○ WALT key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior ● Review of Grade 8 Standards 8.G.6, 8.G.7, & 8.G.8 ○ WALT explain a proof of the Pythagorean Theorem and its converse. ○ WALT apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions. ○ WALT apply the Pythagorean Theorem to find the distance between two points in a coordinate system.
June (Days 168-181)	Unit 11 - Rational Expressions	● A.APR.D.6 ○ WALT rewrite simple rational expressions in different forms. ○ WALT write $\frac{a(x)}{b(x)}$ in the form $q(x)+\frac{r(x)}{b(x)}$ using inspection or long division. ● A.APR.D.7 ○ WALT understand that rational expressions form a system of analogous to the rational numbers, closed under addition, subtraction, multiplication, and division by a nonzero rational expression. ○ WALT add, subtract, multiply, and divide rational expressions.

Unit 1: Equations & Inequalities	
Course: Algebra I	
Timeframe: 15 days	
Unit Essential Questions: ● How do you translate real-life situations into equations?	**Unit Enduring Understandings:** *Students will understand that…*

• How do you solve equations using algebra and other strategies? • How can linear equations be used to model real world data? • How can we translate real-life situations into inequalities? • How do you solve inequalities using algebra and other strategies?	• Equation solving is working backward and undoing operations. • The rules for solving equations can be applied when solving inequalities and absolute value equations. • Solving inequalities is similar to solving equations, working backward and undoing operations, the exception being when multiplying or dividing by a negative number. • The solution to an inequality is a set, not just a single solution. • Absolute value is the distance from zero.
Primary Interdisciplinary Connections: Infused within the unit are connections to the content standards for English Language Arts and Technology, specifically: • NJSLSA.R4 • NJSLSA.R5 • NJSLSA.R7 • NJSLSA.R8 • 8.1.8.D.1 • 8.1.8.D.4 • 8.1.8.E.1	**21st Century Career Ready Practices:** Through well-planned, student-based instruction models, students will develop the attributes that will prepare them for life as citizens and workers in the 21st century: • CRP2 - Apply appropriate academic and technical skills. • CRP4 - Communicate clearly and effectively and with reason. • CRP8 - Utilize critical thinking to make sense of problems and persevere in solving them. • CRP11 - Use technology to enhance productivity. • CRP12 - Work productively in teams while using cultural global competence. • **9.1.8.E.5** Analyze interest rates and fees associated with financial services, credit cards, debit cards, and gift cards. • **9.1.8.B.2** - Construct a simple personal savings and spending plan based on various sources of income. • **9.1.8.B.8** Develop a system for keeping and using financial records. • **9.1.8.D.4** Distinguish between income and investment growth.
Standards for Mathematical Practices: The following Standards for Mathematical Practice will be covered throughout the unit: • MP.1 - Make sense of problems and persevere in solving them. • MP.2 - Reason abstractly and quantitatively. • MP.3 - Construct viable arguments and critique the reasoning of others. • MP.4 - Model with Mathematics. • MP.5 - Use appropriate tools strategically. • MP.6 - Attend to precision. • MP.7 - Look for and make use of structure. • MP.8 - Look for and express regularity in repeated reasoning.	

Learning Targets

Content Standard	Student Learning Objectives	Activities & Resources
A.REI.A.1	• WALT justify each step in solving an equation as a property of equality from the previous step. • WALT construct a viable argument to justify a solution method.	• Big Ideas Math - Purple (Algebra 1) ○ Sections 1.3 E ○ Section 3.4 E ○ Review Pre-Algebra Chap. 1 and 3 • Illustrative Mathematics ○ Equations and Formulas ○ Rewriting equations • Activities on the Team Drive: ○ Who Dunnit Solving Inequalities ○ Who Dunnit Graphing Linear Inequalities ○ Who Dunnit Graphing Absolute Value Inequalities ○ Linear Equation & Inequality Word Problems • PARCC Released Items ○ 2015 PBA: #6,11 ○ 2015 EOY: #15,30,34 ○ 2016: #1,15,19 ○ 2017: #2 ○ 2018: #16
A.REI.A.2	• WALT solve simple rational equations in one variable. • WALT show how extraneous solutions may arise in simple rational equations in one variable by giving examples.	
A.REI.B.3	• WALT solve linear equations in one variable, including equations with coefficients represented by letters. • WALT solve linear inequalities in one variable.	
A.CED.A.4	• WALT rearrange formulas for a specific variable using the same reasoning as solving linear equations.	
A.CED.A.1	• WALT create equations in one variable and use them to solve problems. • WALT create inequalities in one variable and use them to solve problems.	

Evidence of Learning			
Assessment			
Formative Assessments may include: • Observation • Homework • Class participation • Whiteboards/communicators	**Benchmark Assessments may include:** • Beginning of Year i-Ready Diagnostic • Quarterly Portfolio • NJSLA	**Summative Assessments may include:** • Chapter/Unit Test • Quizzes • Presentations • NJSLA	**Alternative Assessments may include:** • Authentic Performance Tasks • Unit Projects

• Do-Now • Notebook • Exit passes			

Modifications & Reflections

Suggested Options for Differentiation

English Language Learners

- Peer tutoring
- Manipulatives
- Use of Home Language
- Limiting Concepts or Vocabulary
- Providing Visuals

Students at Risk of Failure

- Extended Time
- Flexible Grouping
- Small Group Instruction
- Peer Buddies
- Graphic Organizers
- Chunking Information
- Scaffolded Questioning
- Tiered Activities
- Centers in Academic Activity

Special Education

- Extension activities
- Opportunities for Critical Thinking
- Problem Solving/Design Challenges
- Technology Integration
- Student Choice Activities
- Student Driven Activities
- Group Projects
- Tiered Activities

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- Extension activities
- Opportunities for Critical Thinking
- Problem Solving/Design Challenges
- Technology Integration
- Student Choice Activities
- Student Driven Activities
- Group Projects
- Tiered Activities

Gifted & Talented

- Extension activities
- Opportunities for Critical Thinking
- Problem Solving/Design Challenges
- Technology Integration
- Student Choice Activities
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- Group Projects
- Tiered Activities

Unit 2: Graphing Linear Equations & Inequalities	
Course: Algebra I	
Timeframe: 20 days	
Unit Essential Questions: ● How can linear equations be used to model real world data? ● How can linear graphing be used to predict outcomes? ● How do you translate real-life situations into inequalities? ● How do you solve inequalities using algebra and other strategies?	**Unit Enduring Understandings:** *Students will understand that…* ● Linear functions are useful for modeling real-world situations. ● Linear models can be developed from pairs of related data [(x,y) coordinates] and applied to make predictions in context. ● The slope of a linear function can be determined by the rate of change. ● The y-intercept of a linear function is represented as the initial value.
Primary Interdisciplinary Connections: Infused within the unit are connections to the content standards for English Language Arts and Technology, specifically: ● NJSLSA.R4 ● NJSLSA.R5 ● NJSLSA.R7 ● NJSLSA.R8 ● 8.1.8.D.1 ● 8.1.8.D.4 ● 8.1.8.E.1	**21st Century Career Ready Practices:** Through well-planned, student-based instruction models, students will develop the attributes that will prepare them for life as citizens and workers in the 21st century: ● CRP2 - Apply appropriate academic and technical skills. ● CRP4 - Communicate clearly and effectively and with reason. ● CRP8 - Utilize critical thinking to make sense of problems and persevere in solving them. ● CRP11 - Use technology to enhance productivity. ● CRP12 - Work productively in teams while using cultural global competence. ● **9.1.8.B.2** - Construct a simple personal savings and spending plan based on various sources of income. ● **9.1.8.B.8** Develop a system for keeping and using financial records. ● **9.1.8.D.4** Distinguish between income and investment growth.

	• **9.1.8.D.3** Differentiate among various investment options

Standards for Mathematical Practices:
The following Standards for Mathematical Practice will be covered throughout the unit:

- MP.1 - Make sense of problems and persevere in solving them.
- MP.2 - Reason abstractly and quantitatively.
- MP.3 - Construct viable arguments and critique the reasoning of others.
- MP.4 - Model with Mathematics.
- MP.5 - Use appropriate tools strategically.
- MP.6 - Attend to precision.
- MP.7 - Look for and make use of structure.
- MP.8 - Look for and express regularity in repeated reasoning.

Learning Targets		
Content Standard	**Student Learning Objectives**	**Activities & Resources**
A.REI.D.10	• WALT the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).	• Big Ideas Math - Purple (Algebra 1) ○ Review Sections 2.1, 2.2, 2.2 E, 2.3, and 2.5 ○ Sections 2.4, 2.6, and 2.7 ○ Section 12.5 ○ Section 3.5 • Illustrative Mathematics ○ Taxi! ○ Paying the rent ○ Average Cost ○ Kimi and Jordan • Activities on the Team Drive: ○ Converting Standard Form to Slope-intercept Form Maze ○ Graphing Lines in Slope-intercept Form Practice ○ Graphing Linear Inequalities ○ Linear Equation Word Problems ○ Linear Equations in Standard Form Coloring Activity ○ Linear Equations Performance Task ○ Stained Glass Window Algebra Activity
F.LE.A.1.b	• WALT recognize situations in which one quantity changes at a constant rate per unit interval relative to another.	
F.IF.B.6	• WALT calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. • WALT estimate the rate of change from a graph.	
F.LE.A.2	• WALT construct linear functions given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).	
A.CED.A.2	• WALT create equations in two or more	

	variables ot represent relationships between quantities. ● WALT graph equations on coordinate axes with labels and scales.	○ Standard Form Quarterly Practice ● PARCC Released Items ○ 2015 PBA: #2,9,10,12,16,18 ○ 2015 EOY: #2,6,7,12,26,30 ○ 2016: #3 ○ 2017: #3 ○ 2018: #11,13,18,23,27,28
F.LE.B.5	● WALT interpret the parameters in a linear function in terms of a context.	
F.IF.C.9	● WALT compare the properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).	
S.ID.B.6a	● WALT represent data on two quantitative variables on a scatter plot, and describe how the variables are related. ● WALT fit a function to the data using a line of best fit. ● WALT use functions fitted to data to solve problems in the context of the data.	
S.ID.C.7	● WALT interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.	
S.ID.C.8	● WALT compute (using technology) and interpret the correlation coefficient of a linear fit.	
A.REI.D.12	● WALT graph the solutions to a linear inequality in two variables as a half plane (excluding the boundary in the case of a strict inequality).	
A.CED.A.3	● WALT represent constraints by equations or inequalities, and interpret solutions as viable or nonviable options in a modeling context.	

Evidence of Learning

Assessment

Formative Assessments may include:	Benchmark Assessments may include:	Summative Assessments may include:	Alternative Assessments may include:
• Observation • Homework • Class participation • Whiteboards/communicators • Do-Now • Notebook • Exit passes	• Quarterly Portfolio • NJSLA	• Chapter/Unit Test • Quizzes • Presentations • NJSLA	• Authentic Performance Tasks • Unit Projects

Modifications & Reflections

Suggested Options for Differentiation

English Language Learners

- Peer tutoring
- Manipulatives
- Use of Home Language
- Limiting Concepts or Vocabulary
- Providing Visuals

Students at Risk of Failure

- Extended Time
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- Tiered Activities
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Special Education

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- Technology Integration
- Student Choice Activities
- Student Driven Activities

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Unit 3: Systems of Linear Equations & Inequalities	
Course: Algebra I	
Timeframe: 20 days	
Unit Essential Questions: ● How are systems of equations solved using graphing, substitution, and elimination? ● When is it appropriate to use each method? ● What are the three types of solutions to a system? ● What does the intersecting region of a system of inequalities represent? ● How can real world situations be solved using a system of equations or inequalities?	**Unit Enduring Understandings:** *Students will understand that…* ● The intersection of two lines provides a solution to the system. ● Solving systems by graphing has its limitations. ● Multiplying an entire equation by a non-zero constant does not change the value of the equation/inequality. ● A solution to a system of equations has significance in the real world.
Primary Interdisciplinary Connections: Infused within the unit are connections to the content standards for English	**21st Century Career Ready Practices:** Through well-planned, student-based instruction models, students will develop

Language Arts and Technology, specifically: ● NJSLSA.R4 ● NJSLSA.R5 ● NJSLSA.R7 ● NJSLSA.R8 ● 8.1.8.D.1 ● 8.1.8.D.4 ● 8.1.8.E.1	the attributes that will prepare them for life as citizens and workers in the 21st century: ● CRP2 - Apply appropriate academic and technical skills. ● CRP4 - Communicate clearly and effectively and with reason. ● CRP8 - Utilize critical thinking to make sense of problems and persevere in solving them. ● CRP11 - Use technology to enhance productivity. ● CRP12 - Work productively in teams while using cultural global competence. ● **9.1.8.D.3** Differentiate among various investment options ● **9.1.8.C.5** Calculate the cost of borrowing various amounts of money using different types of credit (e.g., credit cards, installment loans, mortgages). ● **9.1.8.D.2** Differentiate among various savings tools and how to use them most effectively.

Standards for Mathematical Practices:
The following Standards for Mathematical Practice will be covered throughout the unit:

- MP.1 - Make sense of problems and persevere in solving them.
- MP.2 - Reason abstractly and quantitatively.
- MP.3 - Construct viable arguments and critique the reasoning of others.
- MP.4 - Model with Mathematics.
- MP.5 - Use appropriate tools strategically.
- MP.6 - Attend to precision.
- MP.7 - Look for and make use of structure.
- MP.8 - Look for and express regularity in repeated reasoning.

Learning Targets		
Content Standard	**Student Learning Objectives**	**Activities & Resources**
A.REI.C.6	● WALT solve systems of linear equations exactly and approximately (e.g., with graphs) focusing on pairs of linear equations in two variables.	● Big Ideas Math - Purple (Algebra 1) ○ Chapter 4 ● Illustrative Mathematics ○ Cash Box ○ Find a System ○ Fishing Adventures 3 ○ Solution Sets
A.REI.C.5	● WALT prove that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a	

	multiple of the other produces a system with the same solutions.	○ Dimes and Quarters ● Activities on the Team Drive: ○ Systems of Equations Stations ○ The Cycle Shop ○ Cash Box ○ Systems of Equations Graphing vs. Substitution Partner Activity ○ Error Analysis Task Cards ● PARCC Released Items ○ 2015 PBA: #4,14 ○ 2015 EOY: #21,25,29 ○ 2016: #5,28,29 ○ 2017: #1,5,7 ○ 2018: #7,22,25
A.CED.A.3	● WALT represent constraints by systems of equations and/or inequalities. ● WALT interpret solutions as viable or nonviable options in a modeling context.	
A.REI.D.11	● WALT explain why the x-coordinates of the points where the graphs of the equations $y = f(x)$ and $y = g(x)$intersect are the solutions of the equation $f(x) = g(x)$. ● WALT find the solutions approximately, e.g., using technology to graph the functions or make tables of values.	
A.REI.D.12	● WALT graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes	

Evidence of Learning			
Assessment			
Formative Assessments may include: ● Observation ● Homework ● Class participation ● Whiteboards/communicators ● Do-Now ● Notebook ● Exit passes	**Benchmark Assessments may include:** ● Quarterly Portfolio ● NJSLA	**Summative Assessments may include:** ● Chapter/Unit Test ● Quizzes ● Presentations ● NJSLA	**Alternative Assessments may include:** ● Authentic Performance Tasks ● Unit Projects

Modifications & Reflections

Suggested Options for Differentiation

English Language Learners

- Peer tutoring
- Manipulatives
- Use of Home Language
- Limiting Concepts or Vocabulary
- Providing Visuals

Students at Risk of Failure

- Extended Time
- Flexible Grouping
- Small Group Instruction
- Peer Buddies
- Graphic Organizers
- Chunking Information
- Scaffolded Questioning
- Tiered Activities
- Centers in Academic Activity

Special Education

- Extension activities
- Opportunities for Critical Thinking
- Problem Solving/Design Challenges
- Technology Integration
- Student Choice Activities
- Student Driven Activities
- Group Projects
- Tiered Activities

504

- Extension activities
- Opportunities for Critical Thinking
- Problem Solving/Design Challenges
- Technology Integration
- Student Choice Activities
- Student Driven Activities
- Group Projects
- Tiered Activities

Gifted & Talented

- Extension activities
- Opportunities for Critical Thinking
- Problem Solving/Design Challenges

- Technology Integration
- Student Choice Activities
- Student Driven Activities
- Group Projects
- Tiered Activities

Unit 4: Functions	
Course: Algebra I	
Timeframe: 15 days	
Unit Essential Questions: ● How can we model real world situations using function notation? ● How can we model real world situations using absolute value? ● When do quantities have a nonlinear relationship?	**Unit Enduring Understandings:** *Students will understand that…* ● Function notation provides instructions to be applied to mathematical expressions. ● Input and output values in a table can be translated to a graph as the x- and y- coordinates.
Primary Interdisciplinary Connections: Infused within the unit are connections to the content standards for English Language Arts and Technology, specifically: ● NJSLSA.R4 ● NJSLSA.R5 ● NJSLSA.R7 ● NJSLSA.R8 ● 8.1.8.D.1 ● 8.1.8.D.4 ● 8.1.8.E.1	**21st Century Career Ready Practices:** Through well-planned, student-based instruction models, students will develop the attributes that will prepare them for life as citizens and workers in the 21st century: ● CRP2 - Apply appropriate academic and technical skills. ● CRP4 - Communicate clearly and effectively and with reason. ● CRP8 - Utilize critical thinking to make sense of problems and persevere in solving them. ● CRP11 - Use technology to enhance productivity. ● CRP12 - Work productively in teams while using cultural global competence. ● **9.1.8.C.5** Calculate the cost of borrowing various amounts of money using different types of credit (e.g., credit cards, installment loans, mortgages). ● **9.1.8.D.2** Differentiate among various savings tools and how to use them most effectively. ● **9.1.8.D.3** Differentiate among various investment options ● **9.2.8.B.2** Develop a Personalized Student Learning Plan with the assistance of an adult mentor that includes information about career areas of interest, goals and an educational plan.

Standards for Mathematical Practices:
The following Standards for Mathematical Practice will be covered throughout the unit:

- MP.1 - Make sense of problems and persevere in solving them.
- MP.2 - Reason abstractly and quantitatively.
- MP.3 - Construct viable arguments and critique the reasoning of others.
- MP.4 - Model with Mathematics.
- MP.5 - Use appropriate tools strategically.
- MP.6 - Attend to precision.
- MP.7 - Look for and make use of structure.
- MP.8 - Look for and express regularity in repeated reasoning.

<table>
<tr><th colspan="3">Learning Targets</th></tr>
<tr><th>Content Standard</th><th>Student Learning Objectives</th><th>Activities & Resources</th></tr>
<tr><td>F.IF.A.1</td><td>• WALT understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range.
• WALT if f is a function and x is an element of its domain, then $f(x)$ denotes the output of f corresponding to the input x.
• WALT the graph of □is the graph of the equation □ = □(□).</td><td rowspan="3">• Big Ideas Math - Purple (Algebra 1)
○ Chapter 5
• Illustrative Mathematics
○ Yam in the Oven
○ Influenza epidemic
○ Warming and Cooling
○ Oakland Coliseum
○ Crude Oil and Gas Mileage
○ Transforming the graph of a function
• Activities on the Team Drive:
○ Arithmetic Sequences Scavenger Hunt
○ Evaluating Functions Scavenger Hunt
○ Party
○ The Concept of a Function from Geometry
• PARCC Released Items
○ 2015 PBA: #1
○ 2015 EOY: #5,16,17,23,28
○ 2016: #9,12,20,23,26
○ 2017: #4,12,16
○ 2018: #19</td></tr>
<tr><td>F.IF.A.2</td><td>• WALT use function notation.
• WALT evaluate functions for inputs in the domains.
• WALT interpret statements that use function notation in terms of a context.</td></tr>
<tr><td>F.IF.B.5</td><td>• WALT relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. For example, if the function □(□)gives the number of person-hours it takes to assemble □engines in a factory, then the positive integers would be an appropriate domain for the function.</td></tr>
</table>

F.IF.C.7.b	• WALT graph piecewise-defined functions, including step functions and absolute value functions.	
F.IF.B.4	• WALT for a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities. • WALT sketch graphs showing key features given a verbal description of the relationship. • WALT key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior.	
F.BF.B.3	• WALT identify the effect on the graph of replacing $f(x)$ by $f(x)+k, kf(x), f(kx), and\ f(x+k)$ for specific values of k (both positive and negative). • WALT find the value of □ in the above scenarios given graphs.	
F.IF.A.3	• WALT recognize that sequences are functions whose domain is a subset of the integers.	
F.BF.A.2	• WALT write arithmetic sequences and use them to model situation.	
F.LE.A.2	• WALT construct linear functions for arithmetic sequences given a graph, a description of a relationship, or two input-output pairs (including reading these from a table).	

Evidence of Learning
Assessment

Formative Assessments may include:	**Benchmark Assessments may include:**	**Summative Assessments may include:**	**Alternative Assessments may include:**
• Observation • Homework • Class participation • Whiteboards/communicators • Do-Now • Notebook • Exit passes	• Quarterly Portfolio • NJSLA	• Chapter/Unit Test • Quizzes • Presentations • NJSLA	• Authentic Performance Tasks • Unit Projects

Modifications & Reflections

Suggested Options for Differentiation

English Language Learners

- Peer tutoring
- Manipulatives
- Use of Home Language
- Limiting Concepts or Vocabulary
- Providing Visuals

Students at Risk of Failure

- Extended Time
- Flexible Grouping
- Small Group Instruction
- Peer Buddies
- Graphic Organizers
- Chunking Information
- Scaffolded Questioning
- Tiered Activities
- Centers in Academic Activity

Special Education

- Extension activities
- Opportunities for Critical Thinking
- Problem Solving/Design Challenges
- Technology Integration
- Student Choice Activities
- Student Driven Activities
- Group Projects
- Tiered Activities

504

- Extension activities
- Opportunities for Critical Thinking

- Problem Solving/Design Challenges
- Technology Integration
- Student Choice Activities
- Student Driven Activities
- Group Projects
- Tiered Activities

Gifted & Talented

- Extension activities
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- Technology Integration
- Student Choice Activities
- Student Driven Activities
- Group Projects
- Tiered Activities

Unit 5: Real Number System, Exponents, & Exponential Functions	
Course: Algebra I	
Timeframe: 15 days	
Unit Essential Questions: ● How do we know if a radical expression is in simplest form? ● How can radical expressions be combined? ● How can you use the properties of real numbers to perform operations on radical expressions? ● How do we compare the differences between linear and exponential growth? ● How can we apply the concept of exponential growth/decay to real world problems?	**Unit Enduring Understandings:** *Students will understand that…* ● Expressions involving exponents may be simplified by applying the laws of exponents. ● The knowledge of radicals is a basis for higher level mathematics. ● Radical expressions with like radicals can be added or subtracted. ● Radical expressions must be in simplest form. ● There can still be a relationship between two variables even if there is no linear pattern. ● Predictions can be made using exponential growth and decay models.
Primary Interdisciplinary Connections: Infused within the unit are connections to the content standards for English Language Arts and Technology, specifically: ● NJSLSA.R4 ● NJSLSA.R5 ● NJSLSA.R7	**21st Century Career Ready Practices:** Through well-planned, student-based instruction models, students will develop the attributes that will prepare them for life as citizens and workers in the 21st century: ● CRP2 - Apply appropriate academic and technical skills. ● CRP4 - Communicate clearly and effectively and with reason.

• NJSLSA.R8 • 8.1.8.D.1 • 8.1.8.D.4 • 8.1.8.E.1	• CRP8 - Utilize critical thinking to make sense of problems and persevere in solving them. • CRP11 - Use technology to enhance productivity. • CRP12 - Work productively in teams while using cultural global competence. • **9.1.8.E.6** Compare the value of goods or services from different sellers when purchasing large quantities and small quantities. • **9.1.8.E.5** Analyze interest rates and fees associated with financial services, credit cards, debit cards, and gift cards. • **9.1.8.D.4** Distinguish between income and investment growth.

Standards for Mathematical Practices:
The following Standards for Mathematical Practice will be covered throughout the unit:

- MP.1 - Make sense of problems and persevere in solving them.
- MP.2 - Reason abstractly and quantitatively.
- MP.3 - Construct viable arguments and critique the reasoning of others.
- MP.4 - Model with Mathematics.
- MP.5 - Use appropriate tools strategically.
- MP.6 - Attend to precision.
- MP.7 - Look for and make use of structure.
- MP.8 - Look for and express regularity in repeated reasoning.

Learning Targets		
Content Standard	**Student Learning Objectives**	**Activities & Resources**
N.RN.B.3	• WALT explain why the sum or product of two rational numbers is rational. • WALT explain that the sum of a rational number and an irrational number is irrational. • WALT explain that the product of a nonzero rational number and an irrational number is irrational.	• Big Ideas Math - Purple (Algebra 1) ○ Sections 6.1, 6.1 E, and 6.2, 6.4, 6.5, and 6.6 ○ Review Real Number System • Illustrative Mathematics ○ Population and Food Supply ○ Exponential Parameters ○ A Lifetime of Savings ○ Linear or exponential? ○ Rumors ○ Boom Town • Activities on the Team Drive:
N.RN.A.1	• WALT explain how the definition of the meaning of rational exponents follows from extending the properties of integer exponents to those values, allowing for a notation for radicals in terms of rational exponents.	

N.RN.A.2	• WALT rewrite expressions involving radicals and rational exponents using the properties of exponents.	○ Approximating Square Roots Matching Puzzles ○ Rational Exponents Radicals Puzzle • PARCC Released Items ○ 2015 PBA: #13,15 ○ 2015 EOY: #4,11,31 ○ 2016: #8,16,18,27 ○ 2017: #6,14,15 ○ 2018: #5,6,17,20
F.IF.C.7e	• WALT graph exponential functions, showing intercepts and end behavior.	
F.LE.A.1a	• WALT prove that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals.	
F.LE.A.1c	• WALT recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another.	
F.LE.A.2	• WALT construct exponential functions given a graph, a description of a relationship, or two input-output pairs (including reading these from a table).	
F.LE.A.3	• WALT observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function.	
F.LE.B.5	• WALT interpret the parameters in an exponential function in terms of a context.	
A.SSE.B.3c	• WALT use the properties of exponents to transform expressions for exponential functions.	
F.IF.C.8b	• WALT use the properties of exponents to interpret expressions for exponential functions.	

Evidence of Learning

Assessment			
Formative Assessments may include: ● Observation ● Homework ● Class participation ● Whiteboards/communicators ● Do-Now ● Notebook ● Exit passes	**Benchmark Assessments may include:** ● Quarterly Portfolio ● NJSLA	**Summative Assessments may include:** ● Chapter/Unit Test ● Quizzes ● Presentations ● NJSLA	**Alternative Assessments may include:** ● Authentic Performance Tasks ● Unit Projects
Modifications & Reflections			
Suggested Options for Differentiation *English Language Learners* ● Peer tutoring ● Manipulatives ● Use of Home Language ● Limiting Concepts or Vocabulary ● Providing Visuals *Students at Risk of Failure* ● Extended Time ● Flexible Grouping ● Small Group Instruction ● Peer Buddies ● Graphic Organizers ● Chunking Information ● Scaffolded Questioning ● Tiered Activities ● Centers in Academic Activity *Special Education* ● Extension activities ● Opportunities for Critical Thinking ● Problem Solving/Design Challenges ● Technology Integration ● Student Choice Activities ● Student Driven Activities ● Group Projects ● Tiered Activities			

504

- Extension activities
- Opportunities for Critical Thinking
- Problem Solving/Design Challenges
- Technology Integration
- Student Choice Activities
- Student Driven Activities
- Group Projects
- Tiered Activities

Gifted & Talented

- Extension activities
- Opportunities for Critical Thinking
- Problem Solving/Design Challenges
- Technology Integration
- Student Choice Activities
- Student Driven Activities
- Group Projects
- Tiered Activities

Unit 6: Polynomials	
Course: Algebra I	
Timeframe: 10 days	
Unit Essential Questions: • How would we perform the basic mathematical operations on polynomials and polynomial equations?	**Unit Enduring Understandings:** *Students will understand that…* • Polynomials can be added and subtracted by combining like terms. • Polynomials can be classified by their degree and the number of terms. • Polynomials can be multiplied using a variety of methods.
Primary Interdisciplinary Connections: Infused within the unit are connections to the content standards for English Language Arts and Technology, specifically: • NJSLSA.R4 • NJSLSA.R5 • NJSLSA.R7 • NJSLSA.R8 • 8.1.8.D.1	**21st Century Career Ready Practices:** Through well-planned, student-based instruction models, students will develop the attributes that will prepare them for life as citizens and workers in the 21st century: • CRP2 - Apply appropriate academic and technical skills. • CRP4 - Communicate clearly and effectively and with reason. • CRP8 - Utilize critical thinking to make sense of problems and persevere in solving them.

• 8.1.8.D.4 • 8.1.8.E.1	• CRP11 - Use technology to enhance productivity. • CRP12 - Work productively in teams while using cultural global competence. • **9.1.8.D.4** Distinguish between income and investment growth. • **9.1.8.C.5** Calculate the cost of borrowing various amounts of money using different types of credit (e.g., credit cards, installment loans, mortgages). • **9.1.8.D.2** Differentiate among various savings tools and how to use them most effectively. • **9.1.8.D.3** Differentiate among various investment options

Standards for Mathematical Practices:
The following Standards for Mathematical Practice will be covered throughout the unit:

- MP.1 - Make sense of problems and persevere in solving them.
- MP.2 - Reason abstractly and quantitatively.
- MP.3 - Construct viable arguments and critique the reasoning of others.
- MP.4 - Model with Mathematics.
- MP.5 - Use appropriate tools strategically.
- MP.6 - Attend to precision.
- MP.7 - Look for and make use of structure.
- MP.8 - Look for and express regularity in repeated reasoning.

Learning Targets		
Content Standard	**Student Learning Objectives**	**Activities & Resources**
A.SSE.A.1a	• WALT interpret parts of an expression, such as terms, factors, and coefficients.	• Big Ideas Math - Purple (Algebra 1) ○ Sections 7.1, 7.2, 7.3, and 7.4 • Illustrative Mathematics ○ Equivalent Expressions • Activities on the Team Drive: ○ Operations with Polynomials Scavenger Hunt • PARCC Released Items ○ 2015 PBA: #5 ○ 2015 EOY: #9,10 ○ 2016: #4 ○ 2017: none ○ 2018: #2,21
A.APR.A.1	• WALT understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication. • WALT add, subtract, and multiply polynomials.	
A.APR.C.4	• WALT prove polynomial identities and use them to describe numerical relationships. For example, the difference of two squares, perfect	

	square trinomials.	

Evidence of Learning			
Assessment			
Formative Assessments may include: ● Observation ● Homework ● Class participation ● Whiteboards/communicators ● Do-Now ● Notebook ● Exit passes	**Benchmark Assessments may include:** ● Quarterly Portfolio ● NJSLA	**Summative Assessments may include:** ● Chapter/Unit Test ● Quizzes ● Presentations ● NJSLA	**Alternative Assessments may include:** ● Authentic Performance Tasks ● Unit Projects
Modifications & Reflections			
Suggested Options for Differentiation *English Language Learners* ● Peer tutoring ● Manipulatives ● Use of Home Language ● Limiting Concepts or Vocabulary ● Providing Visuals *Students at Risk of Failure* ● Extended Time ● Flexible Grouping ● Small Group Instruction ● Peer Buddies ● Graphic Organizers ● Chunking Information ● Scaffolded Questioning ● Tiered Activities ● Centers in Academic Activity *Special Education* ● Extension activities ● Opportunities for Critical Thinking			

- Problem Solving/Design Challenges
- Technology Integration
- Student Choice Activities
- Student Driven Activities
- Group Projects
- Tiered Activities

504

- Extension activities
- Opportunities for Critical Thinking
- Problem Solving/Design Challenges
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- Group Projects
- Tiered Activities

Gifted & Talented

- Extension activities
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- Group Projects
- Tiered Activities

Unit 7: Factoring	
Course: Algebra I	
Timeframe: 10 days	
Unit Essential Questions: ● How could a polynomial be expressed as the product of two or more factors? ● When can a polynomial be factored? ● What terms are used to describe the zeros of a polynomial? ● How can polynomial equations be used to solve real world problems?	**Unit Enduring Understandings:** *Students will understand that…* ● Polynomials can be factored.
Primary Interdisciplinary Connections:	**21st Century Career Ready Practices:**

Infused within the unit are connections to the content standards for English Language Arts and Technology, specifically: ● NJSLSA.R4 ● NJSLSA.R5 ● NJSLSA.R7 ● NJSLSA.R8 ● 8.1.8.D.1 ● 8.1.8.D.4 ● 8.1.8.E.1	Through well-planned, student-based instruction models, students will develop the attributes that will prepare them for life as citizens and workers in the 21st century: ● CRP2 - Apply appropriate academic and technical skills. ● CRP4 - Communicate clearly and effectively and with reason. ● CRP8 - Utilize critical thinking to make sense of problems and persevere in solving them. ● CRP11 - Use technology to enhance productivity. ● CRP12 - Work productively in teams while using cultural global competence. ● **9.1.8.E.6** Compare the value of goods or services from different sellers when purchasing large quantities and small quantities. ● **9.1.8.D.3** Differentiate among various investment options

Standards for Mathematical Practices:
The following Standards for Mathematical Practice will be covered throughout the unit:

- MP.1 - Make sense of problems and persevere in solving them.
- MP.2 - Reason abstractly and quantitatively.
- MP.3 - Construct viable arguments and critique the reasoning of others.
- MP.4 - Model with Mathematics.
- MP.5 - Use appropriate tools strategically.
- MP.6 - Attend to precision.
- MP.7 - Look for and make use of structure.
- MP.8 - Look for and express regularity in repeated reasoning.

Learning Targets		
Content Standard	**Student Learning Objectives**	**Activities & Resources**
A.APR.B.3	● WALT identify zeros of polynomials when suitable factorizations are available.	● Big Ideas Math - Purple (Algebra 1) ○ Sections 7.5, 7.6, 7.8, 7.9, and 7.9 E ● Activities on the Team Drive: ○ The Difference of Two Squares ● PARCC Released Items ○ 2015 PBA: #3, 7 ○ 2015 EOY: #1,3,20,33 ○ 2016: #2,21
A.SSE.B.3a	● WALT factor a quadratic expression to reveal the zeros of the function it defines.	
A.REI.B.4b	● WALT solve quadratic equations in one variable by factoring.	

A.SSE.A.2	• WALT use the structure of an expression to identify ways to rewrite it. For example, see $x^4 - y^4$as $(x^2)^2 - (y^2)^2$, thus recognizing it as a difference of squares that can be factored as $(x^2 - y^2)(x^2 + y^2)$.	○ 2017: none

Evidence of Learning			
Assessment			
Formative Assessments may include: • Observation • Homework • Class participation • Whiteboards/communicators • Do-Now • Notebook • Exit passes	**Benchmark Assessments may include:** • Quarterly Portfolio • NJSLA	**Summative Assessments may include:** • Chapter/Unit Test • Quizzes • Presentations • NJSLA	**Alternative Assessments may include:** • Authentic Performance Tasks • Unit Projects
Modifications & Reflections			
Suggested Options for Differentiation *English Language Learners* • Peer tutoring • Manipulatives • Use of Home Language • Limiting Concepts or Vocabulary • Providing Visuals *Students at Risk of Failure* • Extended Time • Flexible Grouping • Small Group Instruction • Peer Buddies • Graphic Organizers • Chunking Information • Scaffolded Questioning • Tiered Activities • Centers in Academic Activity			

Special Education

- Extension activities
- Opportunities for Critical Thinking
- Problem Solving/Design Challenges
- Technology Integration
- Student Choice Activities
- Student Driven Activities
- Group Projects
- Tiered Activities

504

- Extension activities
- Opportunities for Critical Thinking
- Problem Solving/Design Challenges
- Technology Integration
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- Group Projects
- Tiered Activities

Gifted & Talented

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- Student Choice Activities
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- Group Projects
- Tiered Activities

Unit 8: Graphing Quadratic Functions	
Course: Algebra I	
Timeframe: 15 days	
Unit Essential Questions: • How can we model applications using quadratic functions? • How can we choose a linear, exponential or quadratic equation to model a real world situation? • What terms are used to describe the zeros of a quadratic function?	**Unit Enduring Understandings:** *Students will understand that…* • A quadratic function has the form □ = □□^{2} + □□ + □. • The graph of a quadratic function results in a parabola.

• What does a quadratic function look like?	
Primary Interdisciplinary Connections: Infused within the unit are connections to the content standards for English Language Arts and Technology, specifically: • NJSLSA.R4 • NJSLSA.R5 • NJSLSA.R7 • NJSLSA.R8 • 8.1.8.D.1 • 8.1.8.D.4 • 8.1.8.E.1	**21st Century Career Ready Practices:** Through well-planned, student-based instruction models, students will develop the attributes that will prepare them for life as citizens and workers in the 21st century: • CRP2 - Apply appropriate academic and technical skills. • CRP4 - Communicate clearly and effectively and with reason. • CRP8 - Utilize critical thinking to make sense of problems and persevere in solving them. • CRP11 - Use technology to enhance productivity. • CRP12 - Work productively in teams while using cultural global competence. • **9.1.8.D.3** Differentiate among various investment options • **9.1.8.E.5** Analyze interest rates and fees associated with financial services, credit cards, debit cards, and gift cards • **9.1.8.D.4** Distinguish between income and investment growth.
Standards for Mathematical Practices: The following Standards for Mathematical Practice will be covered throughout the unit: • MP.1 - Make sense of problems and persevere in solving them. • MP.2 - Reason abstractly and quantitatively. • MP.3 - Construct viable arguments and critique the reasoning of others. • MP.4 - Model with Mathematics. • MP.5 - Use appropriate tools strategically. • MP.6 - Attend to precision. • MP.7 - Look for and make use of structure. • MP.8 - Look for and express regularity in repeated reasoning.	

Learning Targets		
Content Standard	**Student Learning Objectives**	**Activities & Resources**

F.IF.B.4	• WALT for a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities.
	• WALT sketch graphs showing key features given a verbal description of the relationship.
		• Big Ideas Math - Purple (Algebra 1)
		  ○ Chapter 8
		• Illustrative Mathematics
		  ○ Rewriting a Quadratic Expression
		  ○ Identifying Quadratic Functions (Standard Form)

	• WALT key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior.	○ Identifying Quadratic Functions (Vertex Form) ○ Which Function? ○ Building a quadratic function from □(□) = □^{2} • PARCC Released Items ○ 2015 PBA: #8 ○ 2015 EOY: #8,22,24,27,32 ○ 2016: #6,7,10,13,14,22 ○ 2017: #6,8,11,13,17 ○ 2018: #1,3,4,15,26
F.IF.C.7a	• WALT graph quadratic functions and show intercepts, maxima, and minima.	
A.APR.B.3	• WALT identify zeros of polynomials when suitable factorizations are available, and use the zeros to construct a rough graph of the function defined by the polynomial.	
A.SSE.B.3b	• WALT complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines.	
F.IF.C.8a	• WALT 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.	
F.IF.B.6	• WALT calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. • WALT estimate the rate of change from a graph.	
F.IF.C.9	• WALT compare the properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).	
F.BF.B.3	• WALT identify the effect on the graph of replacing □(□)by □(□) + □, □□(□), □(□□), □□□ □(□ + □)for specific values of □(both positive and negative). • WALT find the value of □in the above	

	scenarios given graphs.	

Evidence of Learning			
Assessment			
Formative Assessments may include: ● Observation ● Homework ● Class participation ● Whiteboards/communicators ● Do-Now ● Notebook ● Exit passes	**Benchmark Assessments may include:** ● Quarterly Portfolio ● NJSLA	**Summative Assessments may include:** ● Chapter/Unit Test ● Quizzes ● Presentations ● NJSLA	**Alternative Assessments may include:** ● Authentic Performance Tasks ● Unit Projects
Modifications & Reflections			
Suggested Options for Differentiation *English Language Learners* ● Peer tutoring ● Manipulatives ● Use of Home Language ● Limiting Concepts or Vocabulary ● Providing Visuals *Students at Risk of Failure* ● Extended Time ● Flexible Grouping ● Small Group Instruction ● Peer Buddies ● Graphic Organizers ● Chunking Information ● Scaffolded Questioning ● Tiered Activities ● Centers in Academic Activity *Special Education* ● Extension activities ● Opportunities for Critical Thinking			

- Problem Solving/Design Challenges
- Technology Integration
- Student Choice Activities
- Student Driven Activities
- Group Projects
- Tiered Activities

504

- Extension activities
- Opportunities for Critical Thinking
- Problem Solving/Design Challenges
- Technology Integration
- Student Choice Activities
- Student Driven Activities
- Group Projects
- Tiered Activities

Gifted & Talented

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- Tiered Activities

Unit 9: Solving Quadratic Equations	
Course: Algebra I	
Timeframe: 10 days	
Unit Essential Questions: • How can we model applications using quadratic functions? • How can we solve quadratic equations using the quadratic formula, factoring, or the graph of the parabola?	**Unit Enduring Understandings:** *Students will understand that…* • A quadratic equation can be solved by applying a variety of techniques.

• What are the different ways to solve quadratic equations and when is each appropriate?	• A quadratic equation can be solved by using a graphing calculator.
Primary Interdisciplinary Connections: Infused within the unit are connections to the content standards for English Language Arts and Technology, specifically: • NJSLSA.R4 • NJSLSA.R5 • NJSLSA.R7 • NJSLSA.R8 • 8.1.8.D.1 • 8.1.8.D.4 • 8.1.8.E.1	**21st Century Career Ready Practices:** Through well-planned, student-based instruction models, students will develop the attributes that will prepare them for life as citizens and workers in the 21st century: • CRP2 - Apply appropriate academic and technical skills. • CRP4 - Communicate clearly and effectively and with reason. • CRP8 - Utilize critical thinking to make sense of problems and persevere in solving them. • CRP11 - Use technology to enhance productivity. • CRP12 - Work productively in teams while using cultural global competence. • **9.1.8.D.3** Differentiate among various investment options • **9.1.8.E.5** Analyze interest rates and fees associated with financial services, credit cards, debit cards, and gift cards • **9.1.8.D.4** Distinguish between income and investment growth.
Standards for Mathematical Practices: The following Standards for Mathematical Practice will be covered throughout the unit: • MP.1 - Make sense of problems and persevere in solving them. • MP.2 - Reason abstractly and quantitatively. • MP.3 - Construct viable arguments and critique the reasoning of others. • MP.4 - Model with Mathematics. • MP.5 - Use appropriate tools strategically. • MP.6 - Attend to precision. • MP.7 - Look for and make use of structure. • MP.8 - Look for and express regularity in repeated reasoning.	

Learning Targets		
Content Standard	**Student Learning Objectives**	**Activities & Resources**
A.REI.B.4a	• WALT use the method of completing the square to transform any quadratic equation in x into an equation of the form $(x-p)^2 = q$that has the same solutions. • WALT derive the quadratic formula from this	• Big Ideas Math - Purple (Algebra 1) ○ Chapter 9 • Illustrative Mathematics ○ Zero Product Property 3 ○ Zero Product Property 4

	form.	○ Springboard Dive ○ Two Squares are Equal ○ A Linear and Quadratic System ○ Profit of a company ○ Throwing Baseballs ● Activities on the Team Drive: ○ Quadratic Equations Graph Match Dominoes ○ Quadratic Word Problems ○ Solving Quadratic Equations 5 Method Overview ● PARCC Released Items ○ 2015 PBA: #17 ○ 2015 EOY: #18,19 ○ 2016: #11,24 ○ 2017: #9,10 ○ 2018: #10,12,14
A.REI.B.4b	● WALT solve quadratic equations by inspection, taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation.	
A.REI.C.7	● WALT solve a simple system consisting of a linear equation and a quadratic equation in two variables algebraically and graphically.	
A.REI.D.11	● WALT explain why the x-coordinates of the points where the graphs of the equation □ = □(□)and □ = □(□) intersect are the solutions of the equation □(□) = □(□). ● WALT find the solutions approximately, e.g., using technology to graph the functions or make tables of values.	

Evidence of Learning			
Assessment			
Formative Assessments may include: ● Observation ● Homework ● Class participation ● Whiteboards/communicators ● Do-Now ● Notebook ● Exit passes	**Benchmark Assessments may include:** ● Quarterly Portfolio ● NJSLA	**Summative Assessments may include:** ● Chapter/Unit Test ● Quizzes ● Presentations ● NJSLA	**Alternative Assessments may include:** ● Authentic Performance Tasks ● Unit Projects
Modifications & Reflections			
Suggested Options for Differentiation *English Language Learners* ● Peer tutoring			

- Manipulatives
- Use of Home Language
- Limiting Concepts or Vocabulary
- Providing Visuals

Students at Risk of Failure

- Extended Time
- Flexible Grouping
- Small Group Instruction
- Peer Buddies
- Graphic Organizers
- Chunking Information
- Scaffolded Questioning
- Tiered Activities
- Centers in Academic Activity

Special Education

- Extension activities
- Opportunities for Critical Thinking
- Problem Solving/Design Challenges
- Technology Integration
- Student Choice Activities
- Student Driven Activities
- Group Projects
- Tiered Activities

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Unit 10: Square Root Functions & Geometry

Course: Algebra I

Timeframe: 15 days

Unit Essential Questions:
- How do we know if a radical expression is in simplest form?
- How and why should you check your solution to radical equations?

Unit Enduring Understandings:
Students will understand that…
- Radical expressions must be in simplest form.
- The graph of a square root function has unique characteristics.

Primary Interdisciplinary Connections:
Infused within the unit are connections to the content standards for English Language Arts and Technology, specifically:
- NJSLSA.R4
- NJSLSA.R5
- NJSLSA.R7
- NJSLSA.R8
- 8.1.8.D.1
- 8.1.8.D.4
- 8.1.8.E.1

21st Century Career Ready Practices:
Through well-planned, student-based instruction models, students will develop the attributes that will prepare them for life as citizens and workers in the 21st century:
- CRP2 - Apply appropriate academic and technical skills.
- CRP4 - Communicate clearly and effectively and with reason.
- CRP8 - Utilize critical thinking to make sense of problems and persevere in solving them.
- CRP11 - Use technology to enhance productivity.
- CRP12 - Work productively in teams while using cultural global competence.
- **9.1.8.E.6** Compare the value of goods or services from different sellers when purchasing large quantities and small quantities.
- **9.1.8.D.4** Distinguish between income and investment growth.
- **9.1.8.D.2** Differentiate among various savings tools and how to use them most effectively.
- **9.1.8.D.3** Differentiate among various investment options
- **9.2.8.B.2** Develop a Personalized Student Learning Plan with the assistance of an adult mentor that includes information about career areas of interest, goals and an educational plan.

Standards for Mathematical Practices:
The following Standards for Mathematical Practice will be covered throughout the unit:
- MP.1 - Make sense of problems and persevere in solving them.
- MP.2 - Reason abstractly and quantitatively.
- MP.3 - Construct viable arguments and critique the reasoning of others.
- MP.4 - Model with Mathematics.
- MP.5 - Use appropriate tools strategically.

- MP.6 - Attend to precision.
- MP.7 - Look for and make use of structure.
- MP.8 - Look for and express regularity in repeated reasoning.

Learning Targets		
Content Standard	**Student Learning Objectives**	**Activities & Resources**
N.RN.A.2	• WALT rewrite expressions involving radicals.	• Big Ideas Math - Purple (Algebra 1) ○ Chapter 10 • Illustrative Mathematics ○ Radical Equations ○ Who wins the Race? • PARCC Released Items ○ 2015 PBA: none ○ 2015 EOY: none ○ 2016: none ○ 2017: none ○ 2018: #24
A.REI.2	• WALT solve simple radical equations in one variable, and give examples showing how extraneous solutions may arise.	
F.IF.C.7b	• WALT graph square root functions.	
F.IF.B.4	• WALT for a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities. • WALT sketch graphs showing key features given a verbal description of the relationship. • WALT key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior.	
Review of 8.G.6, 8.G.7, & 8.G.8	• WALT explain a proof of the Pythagorean Theorem and its converse. • WALT apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions. • WALT apply the Pythagorean Theorem to find the distance between two points in a coordinate system.	

Evidence of Learning			
Assessment			
Formative Assessments may include: ● Observation ● Homework ● Class participation ● Whiteboards/communicators ● Do-Now ● Notebook ● Exit passes	**Benchmark Assessments may include:** ● Quarterly Portfolio ● NJSLA	**Summative Assessments may include:** ● Chapter/Unit Test ● Quizzes ● Presentations ● NJSLA	**Alternative Assessments may include:** ● Authentic Performance Tasks ● Unit Projects
Modifications & Reflections			
Suggested Options for Differentiation *English Language Learners* ● Peer tutoring ● Manipulatives ● Use of Home Language ● Limiting Concepts or Vocabulary ● Providing Visuals *Students at Risk of Failure* ● Extended Time ● Flexible Grouping ● Small Group Instruction ● Peer Buddies ● Graphic Organizers ● Chunking Information ● Scaffolded Questioning ● Tiered Activities ● Centers in Academic Activity *Special Education* ● Extension activities ● Opportunities for Critical Thinking ● Problem Solving/Design Challenges ● Technology Integration ● Student Choice Activities			

- Student Driven Activities
- Group Projects
- Tiered Activities

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Gifted & Talented

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Unit 11: Rational Expressions	
Course: Algebra I	
Timeframe: 10 days	
Unit Essential Questions: • Why do rational expressions need to have a defined domain? • How can we extend arithmetic properties and processes to algebraic expressions and processes and how can we use these properties and processes to solve problems?	**Unit Enduring Understandings:** *Students will understand that…* • A rational expression is a ratio of polynomial expressions
Primary Interdisciplinary Connections: Infused within the unit are connections to the content standards for English Language Arts and Technology, specifically: • NJSLSA.R4 • NJSLSA.R5	**21st Century Career Ready Practices:** Through well-planned, student-based instruction models, students will develop the attributes that will prepare them for life as citizens and workers in the 21st century: • CRP2 - Apply appropriate academic and technical skills.

• NJSLSA.R7 • NJSLSA.R8 • 8.1.8.D.1 • 8.1.8.D.4 • 8.1.8.E.1	• CRP4 - Communicate clearly and effectively and with reason. • CRP8 - Utilize critical thinking to make sense of problems and persevere in solving them. • CRP11 - Use technology to enhance productivity. • CRP12 - Work productively in teams while using cultural global competence. • **9.1.8.D.4** Distinguish between income and investment growth. • **9.1.8.B.2** Construct a simple personal savings and spending plan based on various sources of income. • **9.1.8.E.5** Analyze interest rates and fees associated with financial services, credit cards, debit cards, and gift cards.

Standards for Mathematical Practices:
The following Standards for Mathematical Practice will be covered throughout the unit:

- MP.1 - Make sense of problems and persevere in solving them.
- MP.2 - Reason abstractly and quantitatively.
- MP.3 - Construct viable arguments and critique the reasoning of others.
- MP.4 - Model with Mathematics.
- MP.5 - Use appropriate tools strategically.
- MP.6 - Attend to precision.
- MP.7 - Look for and make use of structure.
- MP.8 - Look for and express regularity in repeated reasoning.

Learning Targets		
Content Standard	**Student Learning Objectives**	**Activities & Resources**
A.APR.D.6	• WALT rewrite simple rational expressions in different forms. • WALT write $\frac{□(□)}{□(□)}$ in the form $□(□) + \frac{□(□)}{□(□)}$ using inspection or long division.	• Big Ideas Math - Purple (Algebra 1) ○ Sections 11.3, 11.4, 11.5 • PARCC Released Items ○ 2015 PBA: none ○ 2015 EOY: none ○ 2016: none ○ 2017: none ○ 2018: none
A.APR.D.7	• WALT understand that rational expressions form a system of analogous to the rational numbers, closed under addition, subtraction, multiplication, and division by a nonzero rational expression. • WALT add, subtract, multiply, and divide	

	rational expressions.	

Evidence of Learning			
Assessment			
Formative Assessments may include: ● Observation ● Homework ● Class participation ● Whiteboards/communicators ● Do-Now ● Notebook ● Exit passes	**Benchmark Assessments may include:** ● Quarterly Portfolio ● End of Year i-Ready Diagnostic ● NJSLA	**Summative Assessments may include:** ● Chapter/Unit Test ● Quizzes ● Presentations ● NJSLA	**Alternative Assessments may include:** ● Authentic Performance Tasks ● Unit Projects
Modifications & Reflections			

Suggested Options for Differentiation

English Language Learners

- Peer tutoring
- Manipulatives
- Use of Home Language
- Limiting Concepts or Vocabulary
- Providing Visuals

Students at Risk of Failure

- Extended Time
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Special Education

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