Subject Area: Mathematics
Grade Level: Algebra

Unit Name: Solving Linear Equations	Big Ideas Math	Student Paced Time Frame: 2-3 weeks

Overview
In this unit, students will understand solving linear equations.

Enduring Understandings
- Describe how to solve simple equations
- Solve multi-step equations
- Solve absolute value equations
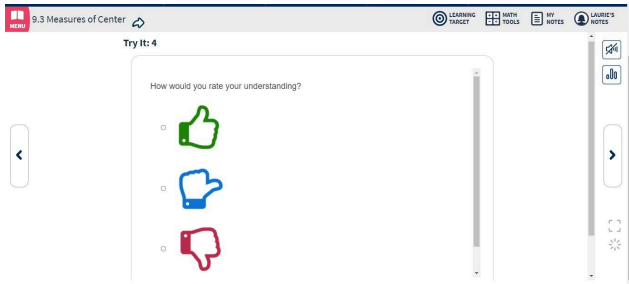- Rewrite equations and formulas

Skill and Knowledge Objectives
- Solve simple equations
- Solve multi step equations
- Solve equations with variables on both sides
- Solve absolute value equations
- Rewrite equations and formulas

New Jersey Social and Emotional Learning Competencies:
Self-Awareness, Self-Management, Social Awareness, Responsible Decision-Making, Relationship Skills

Activities:

- **Thumbs Up:** Infused in every online lesson presentation tool through Big Ideas website Dynamic Classroom. This technique asks students to indicate the extent to which they understand a concept, procedure, or even the direction of activity. This allows students to communicate their feelings with respect to a specific success criterion.

- **English Language Learners:** English language learners strategies infused in every lesson of Big Ideas Teaching Edition

- Sample

📄 **Social Emotional Well Being Activities - All Units**

Pre-Assessment:
- Maintaining Mathematical Proficiency (Computation of integers)
- Renaissance benchmark

Formative Assessment:
- Mid-Unit Assessments
- Chapter Tests A and B
- Alternative Assessment
- STEAM Performance Task
- Online Quiz (Big Ideas Website)- Teacher selected (based on students needs and abilities)

- Web based (Big Ideas) lesson presentation followed by web based Self Assessment Concepts and Skills and Self Assessment for Problems Solving
- Online (Big Ideas Website) - classwork and homework problems - providing automatic results on accuracy to students and teacher

Self-Reflection/Self-Assessment:
- Student Journal Responses
- Mini-Assessments
- Complete Performance Task after completing this unit of instruction.

Summative Assessment:
- Unit Assessment
- Paper tests - Version A, Version B, or Alternative Assessment (based on students needs and abilities)
- Online Test (Big Ideas Website)- Teacher selected problems (based on students needs and abilities)

Accomodations:

Paper based and pdf worksheets (Big Ideas)
- Cumulative practice
- Vocabulary practice
- Prerequisite skills practice
- Extra practice
- Reteach
- Enrichment and Extension
- Puzzle time

Web based practice and assessments
- Practice problems
  - Adjustable time
  - Calculator - 4 function, scientific, or graphing
  - Stepped out video examples
  - Answer check - 0,1,2,3,4,5, or Unlimited
- Tests and quizzes
  - Adjustable time
  - Prevent or Allow late submission
  - Release for review by teacher or upon submission
  - Randomize - recalculates the values for each question so students are not given the same assessment
  - Scramble- rearranges questions so students are not given the same assessment

ELL (ESL) Support
- English language learners strategies infused in Big Ideas Teacher Edition
- Online- Big Ideas Multi-Language Glossary
- Dynamic Student eBook and Dynamic Student Edition includes English and Spanish audio

Big Ideas Video Tutorials

Big Ideas Tutor - live audio support with Big Ideas tutor during select practice problems

Virtual Manipulatives

Digital Examples

Skills Trainer - online (Big Ideas) interactive tool for skills practice - used for remediation or enrichment

<u>Standards</u>
<u>NJ Student Learning Standards for Mathematics High School - Algebra:</u>
HSN-Q.A.1
A. Reason quantitatively and use units to solve problems.
1. Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays
HSA-CED.A.4
A. Create equations that describe numbers or relationships
4. Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. For example, rearrange Ohm's law V = IR to highlight resistance R.
HSA-CED.A.1
A. Create equations that describe numbers or relationships
1. Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions
HSA-REI.A.1
A. Understand solving equations as a process of reasoning and explain the reasoning 1. Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.
HSA-REI.B.3
B. Solve equations and inequalities in one variable
3. Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters

8.1 Technology, 9.1 21st-Century Life & Career Skills and/or Financial Literacy; AND Activities/Lesson(s):

8.1.5.NI.1: Develop models that successfully transmit and receive information using both wired and wireless methods.
8.1.5.NI.2: Describe physical and digital security measures for protecting sensitive personal

information.
8.1.8.CS.1: Recommend improvements to computing devices in order to improve the ways users interact with the devices
and
8.1.8.CS.4: Systematically apply troubleshooting strategies to identify and resolve hardware and software problems in computing systems.
8.1.8.DA.4: Transform data to remove errors and improve the accuracy of the data for analysis.
 https://www.state.nj.us/education/aps/cccs/career/
9.1 21st-Century Life & Career Skills: All students will demonstrate the creative, critical thinking, collaboration, and problem-solving skills needed to function successfully as both global citizens and workers in diverse ethnic and organizational cultures.

A. Critical Thinking and Problem Solving

9.1.8.A.1 Develop strategies to reinforce positive attitudes and productive behaviors that impact critical thinking and problem-solving skills.
9.1.8.A.2 Implement problem-solving strategies to solve a problem in school or the community.
9.1.8.A.3 Summarize strategies used by various organizations and agencies to solve problems that impact communities, and compare them with strategies used by similar organizations in another state or country.
9.1.8.A.4 Design and implement a project management plan using one or more problem-solving strategies.

B. Creativity and Innovation

9.1.8.B.1 Use multiple points of view to create alternative solutions.
9.1.8.B.2 Assess data gathered to solve a problem for which there are varying perspectives (e.g., cross-cultural, gender-specific, generational), and determine how the data can best be used to design multiple solutions.

C. Collaboration, Teamwork, and Leadership

9.1.8.C.1 Determine an individual's responsibility for personal actions and contributions to group activities.
9.1.8.C.2 Demonstrate the use of compromise, consensus, and community building strategies for carrying out different tasks, assignments, and projects.
9.1.8.C.3 Model leadership skills during classroom and extra-curricular activities.

Subject Area: Math Algebra 1		
Unit Name: Solving Linear Inequalities	Big Ideas Math	**3 weeks**

Overview
In this unit, students will understand solving linear inequalities

Enduring Understandings
- Graph inequalities
- Solve one-step inequalities
- Solve multi-step inequalities
- Solve compound and absolute value inequalities
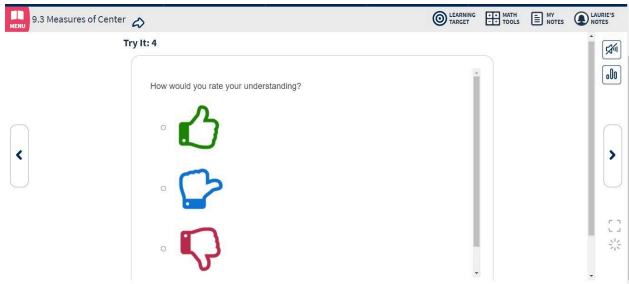
Skill and Knowledge Objectives
- Write and graph inequalities
- Solve inequalities using addition and subtraction
- Solve inequalities using multiplication and division
- Solve multi-step inequalities
- Solve compound inequalities
- Solve absolute value inequalities

New Jersey Social and Emotional Learning Competencies:

Self-Awareness, Self-Management, Social Awareness, Responsible Decision-Making, Relationship Skills

Activities:

- **Thumbs Up:** Infused in every online lesson presentation tool through Big Ideas website Dynamic Classroom. This technique asks students to indicate the extent to which they understand a concept, procedure, or even the direction of activity. This allows students to communicate their feelings with respect to a specific success criterion.

Try It: 4

How would you rate your understanding?

- **English Language Learners**: English language learners strategies infused in every lesson of Big Ideas Teaching Edition

English Language Learners

Vocabulary

In this section, students will use inverse (or opposite) operations to solve equations. Students will use addition to solve a subtraction equation and use subtraction to solve an addition equation. Review the pairs of words listed below. Then give students one word of a pair, and ask them to provide the opposite word.

Examples:

product, quotient	add, subtract
multiply, divide	plus, minus
positive, negative	sum, difference
odd, even	

- Sample

📄 **Social Emotional Well Being Activities - All Units**

Pre-Assessment:
- Maintaining Mathematical Proficiency (Graphing Numbers and Comparing Real Numbers)

Formative Assessment:
- Mid-Unit Assessments
- Chapter Tests A and B
- Alternative Assessment

- STEAM Performance Task
- Online Quiz (Big Ideas Website)- Teacher selected (based on students needs and abilities)
- Web based (Big Ideas) lesson presentation followed by web based Self Assessment Concepts and Skills and Self Assessment for Problems Solving
- Online (Big Ideas Website) - classwork and homework problems - providing automatic results on accuracy to students and teacher

Self-Reflection/Self-Assessment:
- Student Journal Responses
- Mini-Assessments
- Complete Performance Task after completing this unit of instruction.

Summative Assessment:
- Unit Assessment
- Paper tests - Version A, Version B, or Alternative Assessment (based on students needs and abilities)
- Online Test (Big Ideas Website)- Teacher selected problems (based on students needs and abilities)

Accomodations:

Paper based and pdf worksheets (Big Ideas)
- Cumulative practice
- Vocabulary practice
- Prerequisite skills practice
- Extra practice
- Reteach
- Enrichment and Extension
- Puzzle time

Web based practice and assessments
- Practice problems
  - Adjustable time
  - Calculator - 4 function, scientific, or graphing
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Virtual Manipulatives

Digital Examples

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Standards
NJ Student Learning Standards for Mathematics High School - Algebra:

HSA-CED.A.1
A. Create equations that describe numbers or relationships
1. Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions

HSA-REI.B.3
B. Solve equations and inequalities in one variable
3. Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters

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 https://www.state.nj.us/education/aps/cccs/career/
9.1 21st-Century Life & Career Skills: All students will demonstrate the creative, critical thinking, collaboration, and problem-solving skills needed to function successfully as both global citizens and workers in diverse ethnic and organizational cultures.

A. Critical Thinking and Problem Solving

Subject Area: Math Algebra 1		
Unit Name: Graphing Linear Functions	Big Ideas Math	2 weeks

Overview
In this unit, students will understand graphing linear functions

Enduring Understandings
- Determine whether relations are functions
- Identify linear functions
- Graph linear functions
- Describe transformations of graphs of linear functions

Skill and Knowledge Objectives
- Identify linear functions, using graphs, tables, and equations.
- Use function notation to evaluate, interpret, and graph functions.

- Find the slope of a line and use it to write a linear equation in slope-intercept form.
- Solve real-life problems using function notation, linear equations, slopes, and y-intercepts.
- Translate, reflect, stretch, and shrink graphs of linear and absolute functions, and combine transformations of graphs of linear and absolute functions.

New Jersey Social and Emotional Learning Competencies:
Self-Awareness, Self-Management, Social Awareness, Responsible Decision-Making, Relationship Skills

Activities:

- **Thumbs Up:** Infused in every online lesson presentation tool through Big Ideas website Dynamic Classroom. This technique asks students to indicate the extent to which they understand a concept, procedure, or even the direction of activity. This allows students to communicate their feelings with respect to a specific success criterion.

- **English Language Learners:** English language learners strategies infused in every lesson of Big Ideas Teaching Edition

English Language Learners

Vocabulary

In this section, students will use inverse (or opposite) operations to solve equations. Students will use addition to solve a subtraction equation and use subtraction to solve an addition equation. Review the pairs of words listed below. Then give students one word of a pair, and ask them to provide the opposite word.

Examples:

product, quotient	add, subtract
multiply, divide	plus, minus
positive, negative	sum, difference
odd, even	

- Sample

📄 **Social Emotional Well Being Activities - All Units**

Pre-Assessment:
- Maintaining Mathematical Proficiency (Plotting Points and Evaluating Expressions)

Formative Assessment:
- Mid-Unit Assessments
- Chapter Tests A and B
- Alternative Assessment
- STEAM Performance Task
- Online Quiz (Big Ideas Website)- Teacher selected (based on students needs and abilities)
- Web based (Big Ideas) lesson presentation followed by web based Self Assessment Concepts and Skills and Self Assessment for Problems Solving
- Online (Big Ideas Website) - classwork and homework problems - providing automatic results on accuracy to students and teacher

Self-Reflection/Self-Assessment:
- Student Journal Responses
- Mini-Assessments
- Complete Performance Task after completing this unit of instruction.

Summative Assessment:
- Unit Assessment
- Paper tests - Version A, Version B, or Alternative Assessment (based on students needs and abilities)

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Accomodations:

Paper based and pdf worksheets (Big Ideas)
- Cumulative practice
- Vocabulary practice
- Prerequisite skills practice
- Extra practice
- Reteach
- Enrichment and Extension
- Puzzle time

Web based practice and assessments
- Practice problems
    - Adjustable time
    - Calculator - 4 function, scientific, or graphing
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Virtual Manipulatives

Digital Examples

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Standards
NJ Student Learning Standards for Mathematics High School - Algebra:
HSF-IF.A.1

A. Understand the concept of a function and use function notation

1. 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. 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. The graph of f is the graph of the equation y = f(x).

HSA-CED.A.2

A. Create equations that describe numbers or relationships

2. Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.

HSA-REI.D.10

D. Represent and solve equations and inequalities graphically

10. Understand that 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).

HSF-IF.B.5

B. Interpret functions that arise in applications in terms of the context

5. 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.

HSF-IF.C.7a

C. Analyze functions using different representations

7. Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.★

 a. Graph linear and quadratic functions and show intercepts, maxima, and minima.

HSF-LE.A.1b

A. Construct and compare linear and exponential models and solve problems

1. Distinguish between situations that can be modeled with linear functions and with exponential functions.

b. Recognize situations in which one quantity changes at a constant rate per unit interval relative to another

HSF-IF.A.2

A. Understand the concept of a function and use function notation

2. Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.

HSF-IF.C.9

C. Analyze functions using different representations

9. Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). For example, given a graph of one quadratic function and an algebraic expression for another, say which has the larger maximum.

HSF-IF.B.4

B. Build new functions from existing functions

4. Find inverse functions. a. Solve an equation of the form f(x) = c for a simple function f that has an inverse and write an expression for the inverse. For example, f(x) =2 x3 or f(x) = (x+1)/(x–1) for x ≠1. b. (+) Verify by composition that one function is the inverse of another. c. (+) Read values of an inverse function from a graph or a table, given that the function has an

inverse. d. (+) Produce an invertible function from a non-invertible function by restricting the domain

HSF-LE.B.5

B. Interpret expressions for functions in terms of the situation they model

5. Interpret the parameters in a linear or exponential function in terms of a context.

HSF-BF.B.3

B. Build new functions from existing functions

3. Identify the effect on the graph of replacing f(x) by f(x) + k, k f(x), f(kx), and f(x + k) for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them.

HSF-IF.C.7b

C. Analyze functions using different representations

7. Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases

b. Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.

-

8.1 Technology, 9.1 21st-Century Life & Career Skills and/or Financial Literacy; AND Activities/Lesson(s):

8.1.5.NI.1: Develop models that successfully transmit and receive information using both wired and wireless methods.
8.1.5.NI.2: Describe physical and digital security measures for protecting sensitive personal information.
8.1.8.CS.1: Recommend improvements to computing devices in order to improve the ways users interact with the devices
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 https://www.state.nj.us/education/aps/cccs/career/
9.1 21st-Century Life & Career Skills: All students will demonstrate the creative, critical thinking, collaboration, and problem-solving skills needed to function successfully as both global citizens and workers in diverse ethnic and organizational cultures.

A. Critical Thinking and Problem Solving

9.1.8.A.1 Develop strategies to reinforce positive attitudes and productive behaviors that impact critical thinking and problem-solving skills.
9.1.8.A.2 Implement problem-solving strategies to solve a problem in school or the community.
9.1.8.A.3 Summarize strategies used by various organizations and agencies to solve problems that impact communities, and compare them with strategies used by similar organizations in another state or country.
9.1.8.A.4 Design and implement a project management plan using one or more problem-solving strategies.

B. Creativity and Innovation

9.1.8.B.1 Use multiple points of view to create alternative solutions.
9.1.8.B.2 Assess data gathered to solve a problem for which there are varying perspectives (e.g., cross-cultural, gender-specific, generational), and determine how the data can best be used to design multiple solutions.
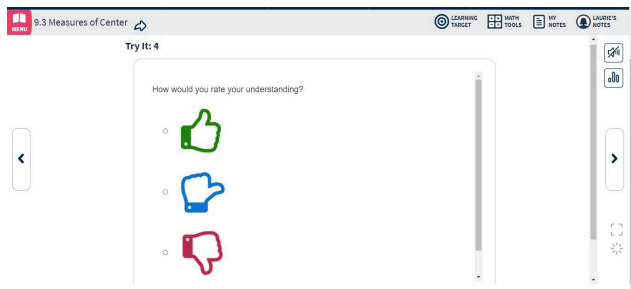
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9.1.8.C.3 Model leadership skills during classroom and extra-curricular activities.

Subject Area: Math Algebra 1		
Unit Name: Writing Linear Functions	Big Ideas Math	2 weeks

Overview
In this unit, students will understand writing linear functions

Enduring Understandings
- Identify and write different forms of linear equations.
- Interpret scatter plots and identify the correlation between data sets.
- Analyze lines of fit.
- Write a function that represents an arithmetic sequence to solve real-life problems

Skill and Knowledge Objectives
- Identify, write, and use linear equations in slope-intercept form and point-slope form.
- Identify, write, and use equations for parallel and perpendicular lines.
- Interpret scatter plots, determine how well lines of fit model data, and distinguish between correlation and causation.
- Extend and graph arithmetic sequences, and write them as functions.
- Evaluate, graph, and write piecewise functions, including step and absolute value functions.

New Jersey Social and Emotional Learning Competencies:
Self-Awareness, Self-Management, Social Awareness, Responsible Decision-Making, Relationship Skills

Activities:

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 - Sample

📄 Social Emotional Well Being Activities - All Units

Pre-Assessment:
- Maintaining Mathematical Proficiency (Using a Coordinate Plane and Rewriting Equations)

Formative Assessment:
- Mid-Unit Assessments
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Digital Examples

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Standards

NJ Student Learning Standards for Mathematics High School - Algebra:

HSA-CED.A.2

A. Create equations that describe numbers or relationships

2. Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.

HSA-REI.D.10

D. Represent and solve equations and inequalities graphically

10. Understand that 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).

HSF-BF.A.1a

A. Build a function that models a relationship between two quantities

1. Write a function that describes a relationship between two quantities.

a. Determine an explicit expression, a recursive process, or steps for calculation from a context.

HSF-LE.A.1b

A. Construct and compare linear and exponential models and solve problems

1. Distinguish between situations that can be modeled with linear functions and with exponential functions.

b. Recognize situations in which one quantity changes at a constant rate per unit interval relative to another.

HSF-LE.A.2

A. Construct and compare linear and exponential models and solve problems

2. Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these

from a table).

HSF-LE.B.5
B. Interpret expressions for functions in terms of the situation they model
5. Interpret the parameters in a linear or exponential function in terms of a context

HSS-ID.B.6a
B. Summarize, represent, and interpret data on two categorical and quantitative variables
6. Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.
a. Fit a function to the data (including with the use of technology); use functions fitted to data to solve problems in the context of the data. Use given functions or choose a function suggested by the context. Emphasize linear and exponential models.

HSS-ID.B.6c
B. Summarize, represent, and interpret data on two categorical and quantitative variables
6. Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.
c. Fit a linear function for a scatter plot that suggests a linear association.

HSS-ID.C.7
C. Interpret linear models
7. Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.

HSS-ID.B.6b
B. Summarize, represent, and interpret data on two categorical and quantitative variables
6. Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.
b. Informally assess the fit of a function by plotting and analyzing residuals, including with the use of technology.

HSS-ID.C.8
C. Interpret linear models
8. Compute (using technology) and interpret the correlation coefficient of a linear fit.

HSS-ID.C.9
C. Interpret linear models
9. Distinguish between correlation and causation

HSF-IF.A.3
A. Understand the concept of a function and use function notation
3. Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers. For example, the Fibonacci sequence is defined recursively by $f(0) = f(1) = 1$, $f(n+1) = f(n) + f(n-1)$ for $n \geq 1$.

HSF-BF.A.2
A. Build a function that models a relationship between two quantities
2. Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms

HSF-IF.C.7b
C. Analyze functions using different representations
7. Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases
b. Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.

8.1 Technology, 9.1 21st-Century Life & Career Skills and/or Financial Literacy; AND Activities/Lesson(s):

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9.1.8.A.3 Summarize strategies used by various organizations and agencies to solve problems that impact communities, and compare them with strategies used by similar organizations in another state or country.
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9.1.8.B.1 Use multiple points of view to create alternative solutions.
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C. Collaboration, Teamwork, and Leadership

9.1.8.C.1 Determine an individual's responsibility for personal actions and contributions to group activities.
9.1.8.C.2 Demonstrate the use of compromise, consensus, and community building strategies for carrying out different tasks, assignments, and projects.
9.1.8.C.3 Model leadership skills during classroom and extra-curricular activities.

Subject Area: Math Algebra 1		
Unit Name: Solving Systems of Linear Equations	Big Ideas Math	2-3 weeks

Overview
In this unit, students will understand solving systems of linear equation

Enduring Understandings
- Define a system of linear equations.
- Describe different methods for solving systems of linear equations.
- Solve systems of linear equations.
- Solve systems of linear inequalities

Skill and Knowledge Objectives
- Solve systems of linear equations by graphing, by substitution, and by elimination.
- Solve absolute value equations by graphing.
- Graph and write systems of linear inequalities.
- Use systems of linear equations and linear inequalities to solve real-life problems

New Jersey Social and Emotional Learning Competencies:
Self-Awareness, Self-Management, Social Awareness, Responsible Decision-Making, Relationship Skills

Activities:

- **Thumbs Up:** Infused in every online lesson presentation tool through Big Ideas website Dynamic Classroom. This technique asks students to indicate the extent to which they understand a concept, procedure, or even the direction of activity. This allows students to communicate their feelings with respect to a specific success criterion.

- **English Language Learners:** English language learners strategies infused in every lesson of Big Ideas Teaching Edition

English Language Learners

Vocabulary
In this section, students will use inverse (or opposite) operations to solve equations. Students will use addition to solve a subtraction equation and use subtraction to solve an addition equation. Review the pairs of words listed below. Then give students one word of a pair, and ask them to provide the opposite word.

Examples:
product, quotient	add, subtract
multiply, divide	plus, minus
positive, negative	sum, difference
odd, even	

- Sample

📄 **Social Emotional Well Being Activities - All Units**

Pre-Assessment:
- Maintaining Mathematical Proficiency (Graphing Linear Functions and Solving and Graphing Linear Inequalities)

Formative Assessment:
- Mid-Unit Assessments
- Chapter Tests A and B
- Alternative Assessment
- STEAM Performance Task
- Online Quiz (Big Ideas Website)- Teacher selected (based on students needs and abilities)
- Web based (Big Ideas) lesson presentation followed by web based Self Assessment Concepts and Skills and Self Assessment for Problems Solving
- Online (Big Ideas Website) - classwork and homework problems - providing automatic results on accuracy to students and teacher

<u>Self-Reflection/Self-Assessment:</u>
- Student Journal Responses
- Mini-Assessments
- Complete Performance Task after completing this unit of instruction.

<u>Summative Assessment:</u>
- Unit Assessment
- Paper tests - Version A, Version B, or Alternative Assessment (based on students needs and abilities)
- Online Test (Big Ideas Website)- Teacher selected problems (based on students needs and abilities)

Accomodations:

Paper based and pdf worksheets (Big Ideas)
- Cumulative practice
- Vocabulary practice
- Prerequisite skills practice
- Extra practice
- Reteach
- Enrichment and Extension
- Puzzle time

Web based practice and assessments
- Practice problems
  - Adjustable time
  - Calculator - 4 function, scientific, or graphing
  - Stepped out video examples
  - Answer check - 0,1,2,3,4,5, or Unlimited
- Tests and quizzes
  - Adjustable time
  - Prevent or Allow late submission
  - Release for review by teacher or upon submission
  - Randomize - recalculates the values for each question so students are not given the same assessment
  - Scramble- rearranges questions so students are not given the same assessment

ELL Support
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- Online- Big Ideas Multi-Language Glossary
- Dynamic Student eBook and Dynamic Student Edition includes English and Spanish audio

Big Ideas Video Tutorials

Big Ideas Tutor - live audio support with Big Ideas tutor during select practice problems

Virtual Manipulatives

Digital Examples

Skills Trainer - online (Big Ideas) interactive tool for skills practice - used for remediation or enrichment

Standards
NJ Student Learning Standards for Mathematics High School - Algebra:

HSA-CED.A.3
A. Create equations that describe numbers or relationships
3. Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context. For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.

HSA-REI.C.6
C. Solve systems of equations
6. Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables

HSA-REI.C.5
C. Solve systems of equations
5. 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.

HSA-REI.D.11
D. Represent and solve equations and inequalities graphically
11. 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 $f(x) = g(x)$; find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where $f(x)$ and/or $g(x)$ are linear, polynomial, rational, absolute value, exponential, and logarithmic functions

HSA-REI.D.12
D. Represent and solve equations and inequalities graphically
12. Graph the solutions to a linear inequality in two variables as a half plane (excluding the boundary in the case of a strict inequality), and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes.

8.1 Technology, 9.1 21st-Century Life & Career Skills and/or Financial Literacy; AND Activities/Lesson(s):

8.1.5.NI.1: Develop models that successfully transmit and receive information using both wired and wireless methods.
8.1.5.NI.2: Describe physical and digital security measures for protecting sensitive personal information.
8.1.8.CS.1: Recommend improvements to computing devices in order to improve the ways users interact with the devices
and
8.1.8.CS.4: Systematically apply troubleshooting strategies to identify and resolve hardware and

software problems in computing systems.
8.1.8.DA.4: Transform data to remove errors and improve the accuracy of the data for analysis.
 https://www.state.nj.us/education/aps/cccs/career/
9.1 21st-Century Life & Career Skills: All students will demonstrate the creative, critical thinking, collaboration, and problem-solving skills needed to function successfully as both global citizens and workers in diverse ethnic and organizational cultures.

A. Critical Thinking and Problem Solving

9.1.8.A.1 Develop strategies to reinforce positive attitudes and productive behaviors that impact critical thinking and problem-solving skills.
9.1.8.A.2 Implement problem-solving strategies to solve a problem in school or the community.
9.1.8.A.3 Summarize strategies used by various organizations and agencies to solve problems that impact communities, and compare them with strategies used by similar organizations in another state or country.
9.1.8.A.4 Design and implement a project management plan using one or more problem-solving strategies.

B. Creativity and Innovation

9.1.8.B.1 Use multiple points of view to create alternative solutions.
9.1.8.B.2 Assess data gathered to solve a problem for which there are varying perspectives (e.g., cross-cultural, gender-specific, generational), and determine how the data can best be used to design multiple solutions.

C. Collaboration, Teamwork, and Leadership

9.1.8.C.1 Determine an individual's responsibility for personal actions and contributions to group activities.
9.1.8.C.2 Demonstrate the use of compromise, consensus, and community building strategies for carrying out different tasks, assignments, and projects.
9.1.8.C.3 Model leadership skills during classroom and extra-curricular activities.

Subject Area: Math Algebra 1		
Unit Name: Exponential Functions and	Big Ideas Math	3 weeks

Sequences		

Overview
In this unit, students will understand exponential functions and sequences.

Enduring Understandings
- Identify and use properties of exponents.
- Model exponential functions.
- Solve exponential equations.
- Write an explicit and a recursive rule for a geometric sequence.
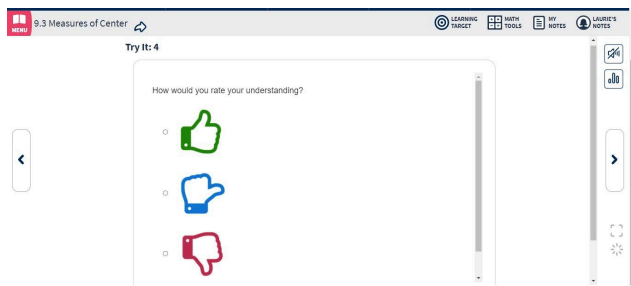
Skill and Knowledge Objectives
- Evaluate and simplify expressions with exponents, including rational exponents; find nth roots.
- Identify, evaluate, and graph exponential functions; use, identify, interpret, and rewrite exponential growth and decay functions; solve real-life problems.
- Solve exponential equations.
- Identify, extend, and graph geometric sequences; write geometric sequences as functions.
- Write terms and rules of recursively defined sequences; translate between recursive and explicit rules.

New Jersey Social and Emotional Learning Competencies:
Self-Awareness, Self-Management, Social Awareness, Responsible Decision-Making, Relationship Skills

Activities:

- **Thumbs Up:** Infused in every online lesson presentation tool through Big Ideas website Dynamic Classroom. This technique asks students to indicate the extent to which they understand a concept, procedure, or even the direction of activity. This allows students to communicate their feelings with respect to a specific success criterion.

- **English Language Learners**: English language learners strategies infused in every lesson of Big Ideas Teaching Edition

English Language Learners

Vocabulary
In this section, students will use inverse (or opposite) operations to solve equations. Students will use addition to solve a subtraction equation and use subtraction to solve an addition equation. Review the pairs of words listed below. Then give students one word of a pair, and ask them to provide the opposite word.

Examples:

product, quotient	add, subtract
multiply, divide	plus, minus
positive, negative	sum, difference
odd, even	

- Sample

📰 **Social Emotional Well Being Activities - All Units**

Pre-Assessment:
- Maintaining Mathematical Proficiency (Using Order of Operations, Finding Square Roots, and Solving and Writing Equations for Arithmetic Sequences)

Formative Assessment:
- Mid-Unit Assessments
- Chapter Tests A and B
- Alternative Assessment
- STEAM Performance Task
- Online Quiz (Big Ideas Website)- Teacher selected (based on students needs and abilities)
- Web based (Big Ideas) lesson presentation followed by web based Self Assessment Concepts and Skills and Self Assessment for Problems Solving
- Online (Big Ideas Website) - classwork and homework problems - providing automatic results on accuracy to students and teacher

Self-Reflection/Self-Assessment:
- Student Journal Responses
- Mini-Assessments
- Complete Performance Task after completing this unit of instruction.

Summative Assessment:
- Unit Assessment
- Paper tests - Version A, Version B, or Alternative Assessment (based on students needs and abilities)
- Online Test (Big Ideas Website)- Teacher selected problems (based on students needs and abilities)

Accomodations:

Paper based and pdf worksheets (Big Ideas)
- Cumulative practice
- Vocabulary practice
- Prerequisite skills practice
- Extra practice
- Reteach
- Enrichment and Extension
- Puzzle time

Web based practice and assessments
- Practice problems
  - Adjustable time
  - Calculator - 4 function, scientific, or graphing
  - Stepped out video examples
  - Answer check - 0,1,2,3,4,5, or Unlimited
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Virtual Manipulatives

Digital Examples

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Standards
NJ Student Learning Standards for Mathematics High School - Algebra:

HSN-RN.A.2
A. Extend the properties of exponents to rational exponents.
2. Rewrite expressions involving radicals and rational exponents using the properties of exponents.
HSN-RN.A.1
A. Extend the properties of exponents to rational exponents.
1. 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, we define 51/3 to be the cube root of 5 because we want (51/3) 3 = 5(1/3) 3 to hold, so (51/3) 3 must equal 5.
HSA-CED.A.2
A. Create equations that describe numbers or relationships
2. Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.
HSF-IF.B.4
B. Interpret functions that arise in applications in terms of the context
4. For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.
HSF-IF.C.7e
C. Analyze functions using different representations
7. Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.
e. Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.
HSF-IF.C.9
C. Analyze functions using different representations
9. Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). For example, given a graph of one quadratic function and an algebraic expression for another, say which has the larger maximum.
HSF-BF.A.1a
A. Build a function that models a relationship between two quantities
1. Write a function that describes a relationship between two quantities.
a. Determine an explicit expression, a recursive process, or steps for calculation from a context.
HSF-BF.B.3
B. Build new functions from existing functions
3. Identify the effect on the graph of replacing f(x) by f(x) + k, k f(x), f(kx), and f(x + k) for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them.
HSF-LE.A.1a
A. Construct and compare linear and exponential models and solve problems
1. Distinguish between situations that can be modeled with linear functions and with exponential functions.
a. Prove that linear functions grow by equal differences over equal intervals, and that

exponential functions grow by equal factors over equal intervals.

HSF-LE.A.2
A. Construct and compare linear and exponential models and solve problems
2. Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).

HSA-SSE.B.3c
B. Write expressions in equivalent forms to solve problems
3. Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression
c. Use the properties of exponents to transform expressions for exponential functions. For example the expression 1.15t can be rewritten as (1.151/12) 12t ≈1.01212t to reveal the approximate equivalent monthly interest rate if the annual rate is 15%

HSF-IF.C.8b
C. Analyze functions using different representations
8. Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.
b. Use the properties of exponents to interpret expressions for exponential functions. For example, identify percent rate of change in functions such as $y = (1.02)t$, $y = (0.97)t$, $y = (1.01)12t$, $y = (1.2)t/10$, and classify them as representing exponential growth or decay.

HSF-LE.A.1c
A. Construct and compare linear and exponential models and solve problems
1. Distinguish between situations that can be modeled with linear functions and with exponential functions.
c. Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another

HSA-CED.A.1
A. Create equations that describe numbers or relationships
1. Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions.

HSA-REI.A.1
A. Understand solving equations as a process of reasoning and explain the reasoning
1. Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.

HSA-REI.D.11
D. Represent and solve equations and inequalities graphically
11. 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 $f(x) = g(x)$; find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where $f(x)$ and/or $g(x)$ are linear, polynomial, rational, absolute value, exponential, and logarithmic functions

HSF-IF.A.3
A. Understand the concept of a function and use function notation
3. Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers. For example, the Fibonacci sequence is defined recursively by $f(0) = f(1) = 1$, $f(n+1) = f(n) + f(n-1)$ for $n \geq 1$.

HSF-BF.A.2

A. Build a function that models a relationship between two quantities
2. Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms.

8.1 Technology, 9.1 21st-Century Life & Career Skills and/or Financial Literacy; AND Activities/Lesson(s):

8.1.5.NI.1: Develop models that successfully transmit and receive information using both wired and wireless methods.
8.1.5.NI.2: Describe physical and digital security measures for protecting sensitive personal information.
8.1.8.CS.1: Recommend improvements to computing devices in order to improve the ways users interact with the devices
and
8.1.8.CS.4: Systematically apply troubleshooting strategies to identify and resolve hardware and software problems in computing systems.
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 https://www.state.nj.us/education/aps/cccs/career/
9.1 21st-Century Life & Career Skills: All students will demonstrate the creative, critical thinking, collaboration, and problem-solving skills needed to function successfully as both global citizens and workers in diverse ethnic and organizational cultures.

A. Critical Thinking and Problem Solving

9.1.8.A.1 Develop strategies to reinforce positive attitudes and productive behaviors that impact critical thinking and problem-solving skills.
9.1.8.A.2 Implement problem-solving strategies to solve a problem in school or the community.
9.1.8.A.3 Summarize strategies used by various organizations and agencies to solve problems that impact communities, and compare them with strategies used by similar organizations in another state or country.
9.1.8.A.4 Design and implement a project management plan using one or more problem-solving strategies.

B. Creativity and Innovation

9.1.8.B.1 Use multiple points of view to create alternative solutions.
9.1.8.B.2 Assess data gathered to solve a problem for which there are varying perspectives (e.g., cross-cultural, gender-specific, generational), and determine how the data can best be used to design multiple solutions.

C. Collaboration, Teamwork, and Leadership

9.1.8.C.1 Determine an individual's responsibility for personal actions and contributions to group activities.
9.1.8.C.2 Demonstrate the use of compromise, consensus, and community building strategies for carrying out different tasks, assignments, and projects.
9.1.8.C.3 Model leadership skills during classroom and extra-curricular activities.

Subject Area: Math Algebra 1		
Unit Name: Polynomial Equations and Factoring	**Big Ideas Math**	**3-4 weeks**

Overview
In this unit, students will understand polynomial equations and factoring

Enduring Understandings
- Classify polynomials by degree and number of terms.
- Add, subtract, and multiply polynomials.
- Solve polynomial equations.
- Factor polynomials and use factoring to solve real-life problems
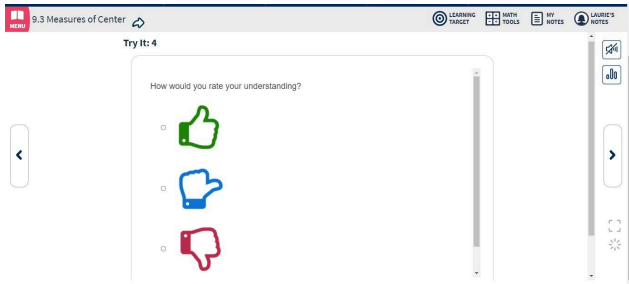
Skill and Knowledge Objectives
- Classify, add, and subtract polynomials.
- Use the FOIL Method, the square of a binomial pattern, and the sum and difference pattern to multiply binomials; multiply binomials and trinomials.
- Solve polynomial equations by using the Zero-Product Property and by factoring out the GCF.
- Factor $x^2 + bx + c$, $ax^2 + bx + c$, the difference of two squares, and perfect square trinomials.
- Use sums, differences, products, and complete factoring of polynomials to solve real-life problems.

New Jersey Social and Emotional Learning Competencies:
Self-Awareness, Self-Management, Social Awareness, Responsible Decision-Making, Relationship Skills

Activities:

- **Thumbs Up:** Infused in every online lesson presentation tool through Big Ideas website Dynamic Classroom. This technique asks students to indicate the extent to which they understand a concept, procedure, or even the direction of activity. This allows students to communicate their feelings with respect to a specific success criterion.

- **English Language Learners**: English language learners strategies infused in every lesson of Big Ideas Teaching Edition

 - Sample

📄 **Social Emotional Well Being Activities - All Units**

Pre-Assessment:
- Maintaining Mathematical Proficiency (Simplifying Algebraic Expressions and Finding the Greatest Common Factor)

Formative Assessment:
- Mid-Unit Assessments
- Chapter Tests A and B
- Alternative Assessment
- STEAM Performance Task
- Online Quiz (Big Ideas Website)- Teacher selected (based on students needs and abilities)
- Web based (Big Ideas) lesson presentation followed by web based Self Assessment Concepts and Skills and Self Assessment for Problems Solving
- Online (Big Ideas Website) - classwork and homework problems - providing automatic results on accuracy to students and teacher

Self-Reflection/Self-Assessment:
- Student Journal Responses
- Mini-Assessments
- Complete Performance Task after completing this unit of instruction.

Summative Assessment:
- Unit Assessment
- Paper tests - Version A, Version B, or Alternative Assessment (based on students needs and abilities)
- Online Test (Big Ideas Website)- Teacher selected problems (based on students needs and abilities)

Accomodations:

Paper based and pdf worksheets (Big Ideas)
- Cumulative practice
- Vocabulary practice
- Prerequisite skills practice
- Extra practice
- Reteach
- Enrichment and Extension
- Puzzle time

Web based practice and assessments
- Practice problems
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Standards
NJ Student Learning Standards for Mathematics High School - Algebra:

HSA-APR.A.1
A. Perform arithmetic operations on polynomials
1. Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.

HSA-APR.B.3
B. Understand the relationship between zeros and factors of polynomials
3. 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.

HSA-REI.B.4b
B. Solve equations and inequalities in one variable
4. Solve quadratic equations in one variable.
b. Solve quadratic equations by inspection (e.g., for $x^2 = 49$), taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as $a \pm bi$ for real numbers a and b.

HSA-SSE.A.2
A. Interpret the structure of expressions
2. 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 $(x^2 - y^2)(x^2 + y^2)$.

HSA-SSE.B.3a

B. Write expressions in equivalent forms to solve problems
3. Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.
a. Factor a quadratic expression to reveal the zeros of the function it defines.

8.1 Technology, 9.1 21st-Century Life & Career Skills and/or Financial Literacy; AND Activities/Lesson(s):

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 https://www.state.nj.us/education/aps/cccs/career/
9.1 21st-Century Life & Career Skills: All students will demonstrate the creative, critical thinking, collaboration, and problem-solving skills needed to function successfully as both global citizens and workers in diverse ethnic and organizational cultures.

A. Critical Thinking and Problem Solving

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B. Creativity and Innovation

9.1.8.B.1 Use multiple points of view to create alternative solutions.
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C. Collaboration, Teamwork, and Leadership

9.1.8.C.1 Determine an individual's responsibility for personal actions and contributions to group activities.
9.1.8.C.2 Demonstrate the use of compromise, consensus, and community building strategies for carrying out different tasks, assignments, and projects.
9.1.8.C.3 Model leadership skills during classroom and extra-curricular activities.

Subject Area: Math Algebra 1		
Unit Name: Graphing Quadratic Functions	Big Ideas Math	3 weeks

Overview
In this unit, students will understand graphing quadratic functions

Enduring Understandings
- Identify characteristics of quadratic functions.
- Describe how to graph quadratic functions in different forms.
- Intercept form to find zeros of functions.
- Choose an appropriate function to model data.

Skill and Knowledge Objectives
- Graph and use quadratic functions in different forms.
- Find maximum and minimum values of quadratic functions.
- Identify even and odd functions.
- Use intercept form to find zeros of functions.
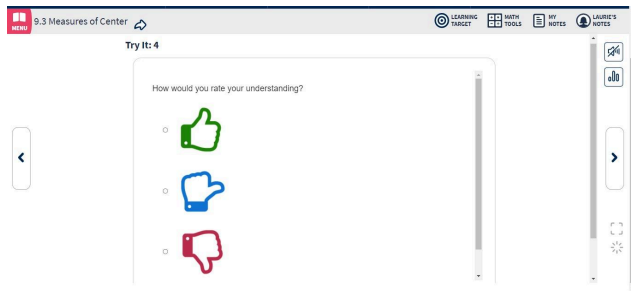- Choose functions to model data and solve real-life problems using different function types.

New Jersey Social and Emotional Learning Competencies:

Self-Awareness, Self-Management, Social Awareness, Responsible Decision-Making, Relationship Skills

Activities:

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communicate their feelings with respect to a specific success criterion.

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 - Sample

📄 **Social Emotional Well Being Activities - All Units**

Pre-Assessment:
- Maintaining Mathematical Proficiency (Graphing Linear Equations and Evaluating Expressions)

Formative Assessment:
- Mid-Unit Assessments
- Chapter Tests A and B

- Alternative Assessment
- STEAM Performance Task
- Online Quiz (Big Ideas Website)- Teacher selected (based on students needs and abilities)
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Summative Assessment:
- Unit Assessment
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Accomodations:

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- Vocabulary practice
- Prerequisite skills practice
- Extra practice
- Reteach
- Enrichment and Extension
- Puzzle time

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  - Adjustable time
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Digital Examples

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Standards
NJ Student Learning Standards for Mathematics High School - Algebra:

HSA-CED.A.2
A. Create equations that describe numbers or relationships
2. Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.

HSF-IF.C.7a
C. Analyze functions using different representations
7. Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.
a. Graph linear and quadratic functions and show intercepts, maxima, and minima.

HSA-APR.B.3
B. Understand the relationship between zeros and factors of polynomials
3. 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.

HSF-BF.B.3
B. Build new functions from existing functions
3. Identify the effect on the graph of replacing $f(x)$ by $f(x) + k$, $k f(x)$, $f(kx)$, and $f(x + k)$ for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them.

HSF-IF.C.9
C. Analyze functions using different representations
9. Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). For example, given a graph of one quadratic function and an algebraic expression for another, say which has the larger maximum. Building Functions

HSF-IF.B.4
B. Interpret functions that arise in applications in terms of the context
4. For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.

HSF-BF.A.1a
A. Build a function that models a relationship between two quantities
1. Write a function that describes a relationship between two quantities.
a. Determine an explicit expression, a recursive process, or steps for calculation from a context.
HSA-SSE.B.3a
B. Write expressions in equivalent forms to solve problems
3. Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.
a. Factor a quadratic expression to reveal the zeros of the function it defines.
HSF-IF.C.8a
C. Analyze functions using different representations
8. Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.
a. Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context.
HSF-IF.B.6
B. Interpret functions that arise in applications in terms of the context
6. Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph
HSF-LE.A.3
A. Construct and compare linear and exponential models and solve problems
3. Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function

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8.1 Technology, 9.1 21st-Century Life & Career Skills and/or Financial Literacy; AND Activities/Lesson(s):

8.1.5.NI.1: Develop models that successfully transmit and receive information using both wired and wireless methods.
8.1.5.NI.2: Describe physical and digital security measures for protecting sensitive personal information.
8.1.8.CS.1: Recommend improvements to computing devices in order to improve the ways users interact with the devices
and
8.1.8.CS.4: Systematically apply troubleshooting strategies to identify and resolve hardware and software problems in computing systems.
8.1.8.DA.4: Transform data to remove errors and improve the accuracy of the data for analysis.
 https://www.state.nj.us/education/aps/cccs/career/
9.1 21st-Century Life & Career Skills: All students will demonstrate the creative, critical thinking, collaboration, and problem-solving skills needed to function successfully as both global citizens and workers in diverse ethnic and organizational cultures.

A. Critical Thinking and Problem Solving

9.1.8.A.1 Develop strategies to reinforce positive attitudes and productive behaviors that impact critical thinking and problem-solving skills.

9.1.8.A.2 Implement problem-solving strategies to solve a problem in school or the community.
9.1.8.A.3 Summarize strategies used by various organizations and agencies to solve problems that impact communities, and compare them with strategies used by similar organizations in another state or country.
9.1.8.A.4 Design and implement a project management plan using one or more problem-solving strategies.

B. Creativity and Innovation

9.1.8.B.1 Use multiple points of view to create alternative solutions.
9.1.8.B.2 Assess data gathered to solve a problem for which there are varying perspectives (e.g., cross-cultural, gender-specific, generational), and determine how the data can best be used to design multiple solutions.

C. Collaboration, Teamwork, and Leadership

9.1.8.C.1 Determine an individual's responsibility for personal actions and contributions to group activities.
9.1.8.C.2 Demonstrate the use of compromise, consensus, and community building strategies for carrying out different tasks, assignments, and projects.
9.1.8.C.3 Model leadership skills during classroom and extra-curricular activities.

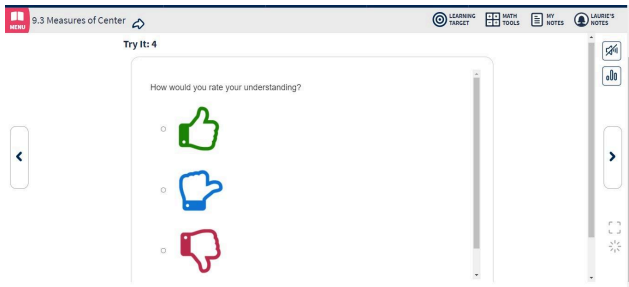| Subject Area: Math Algebra 1		
Unit Name: Solving Quadratic Equations	Big Ideas Math	3 weeks
Overview In this unit, students will understand solving quadratic equations		
Enduring Understandings ● Simplify expressions using properties of radicals. ● Describe different methods for solving quadratic equations. ● Solve quadratic equations. ● Solve systems of nonlinear equations graphically and algebraically		
Skill and Knowledge Objectives ● Simplify expressions and perform operations, using the properties of radicals. ● Solve quadratic equations by graphing, using square roots, completing the square, and using the Quadratic Formula. ● Approximate solutions of quadratic equations and of nonlinear systems and equations. ● Solve systems of nonlinear equations by graphing and algebraically. ● Solve real-life problems using graphs of quadratic functions and by completing the square.		

New Jersey Social and Emotional Learning Competencies:
Self-Awareness, Self-Management, Social Awareness, Responsible Decision-Making, Relationship Skills

Activities:

- **Thumbs Up:** Infused in every online lesson presentation tool through Big Ideas website Dynamic Classroom. This technique asks students to indicate the extent to which they understand a concept, procedure, or even the direction of activity. This allows students to communicate their feelings with respect to a specific success criterion.

- **English Language Learners:** English language learners strategies infused in every lesson of Big Ideas Teaching Edition

 - Sample

📄 **Social Emotional Well Being Activities - All Units**

Pre-Assessment:
- Maintaining Mathematical Proficiency (Factoring Perfect Square Trinomials and Solving Systems of Linear Equations by Graphing)

Formative Assessment:
- Mid-Unit Assessments
- Chapter Tests A and B
- Alternative Assessment
- STEAM Performance Task
- Online Quiz (Big Ideas Website)- Teacher selected (based on students needs and abilities)
- Web based (Big Ideas) lesson presentation followed by web based Self Assessment Concepts and Skills and Self Assessment for Problems Solving
- Online (Big Ideas Website) - classwork and homework problems - providing automatic results on accuracy to students and teacher

Self-Reflection/Self-Assessment:
- Student Journal Responses
- Mini-Assessments
- Complete Performance Task after completing this unit of instruction.

Summative Assessment:
- Unit Assessment
- Paper tests - Version A, Version B, or Alternative Assessment (based on students needs and abilities)
- Online Test (Big Ideas Website)- Teacher selected problems (based on students needs and abilities)

Accomodations:

Paper based and pdf worksheets (Big Ideas)
- Cumulative practice
- Vocabulary practice
- Prerequisite skills practice
- Extra practice
- Reteach
- Enrichment and Extension
- Puzzle time

Web based practice and assessments
- Practice problems
  - Adjustable time
  - Calculator - 4 function, scientific, or graphing
  - Stepped out video examples
  - Answer check - 0,1,2,3,4,5, or Unlimited
- Tests and quizzes

- Adjustable time
- Prevent or Allow late submission
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Virtual Manipulatives

Digital Examples

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Standards
NJ Student Learning Standards for Mathematics High School - Algebra:

HSN-RN.A.2
A. Extend the properties of exponents to rational exponents.
2. Rewrite expressions involving radicals and rational exponents using the properties of exponents.
HSN-RN.B.3
B. Use properties of rational and irrational numbers.
3. Explain why the sum or product of two rational numbers is rational; that the sum of a rational number and an irrational number is irrational; and that the product of a nonzero rational number and an irrational number is irrational.
HSA-REI.D.11
D. Represent and solve equations and inequalities graphically
11. 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 $f(x) = g(x)$; find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where $f(x)$ and/or $g(x)$ are linear, polynomial, rational, absolute value, exponential, and logarithmic functions.
HSF-IF.C.7a
C. Analyze functions using different representations
7. Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.
a. Graph linear and quadratic functions and show intercepts, maxima, and minima.
HSA-CED.A.1
A. Create equations that describe numbers or relationships
1. Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions.

HSA-CED.A.4
A. Create equations that describe numbers or relationships
4. Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. For example, rearrange Ohm's law V = IR to highlight resistance R.
HSA-REI.B.4b
B. Solve equations and inequalities in one variable
4. Solve quadratic equations in one variable.
b. Solve quadratic equations by inspection (e.g., for x² = 49), taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as a ± bi for real numbers a and b.
HSA-SSE.B.3b
B. Write expressions in equivalent forms to solve problems
3. Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.
b. Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines
HSA-REI.B.4a
B. Solve equations and inequalities in one variable
4. Solve quadratic equations in one variable.
a. 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. Derive the quadratic formula from this form.
HSF-IF.C.8a
C. Analyze functions using different representations
8. Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.
a. Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context.
HSA-REI.C.7
C. Solve systems of equations
7. Solve a simple system consisting of a linear equation and a quadratic equation in two variables algebraically and graphically. For example, find the points of intersection between the line y = –3x and the circle x² + y² = 3.

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8.1.8.DA.4: Transform data to remove errors and improve the accuracy of the data for analysis.

9.1 21st-Century Life & Career Skills: All students will demonstrate the creative, critical thinking, collaboration, and problem-solving skills needed to function successfully as both global citizens and workers in diverse ethnic and organizational cultures.

A. Critical Thinking and Problem Solving

9.1.8.A.1 Develop strategies to reinforce positive attitudes and productive behaviors that impact critical thinking and problem-solving skills.
9.1.8.A.2 Implement problem-solving strategies to solve a problem in school or the community.
9.1.8.A.3 Summarize strategies used by various organizations and agencies to solve problems that impact communities, and compare them with strategies used by similar organizations in another state or country.
9.1.8.A.4 Design and implement a project management plan using one or more problem-solving strategies.

B. Creativity and Innovation

9.1.8.B.1 Use multiple points of view to create alternative solutions.
9.1.8.B.2 Assess data gathered to solve a problem for which there are varying perspectives (e.g., cross-cultural, gender-specific, generational), and determine how the data can best be used to design multiple solutions.

C. Collaboration, Teamwork, and Leadership

9.1.8.C.1 Determine an individual's responsibility for personal actions and contributions to group activities.
9.1.8.C.2 Demonstrate the use of compromise, consensus, and community building strategies for carrying out different tasks, assignments, and projects.
9.1.8.C.3 Model leadership skills during classroom and extra-curricular activities.

Subject Area: Math Algebra 1		
Unit Name: Radical Functions and Equations	Big Ideas Math	2 weeks

Overview
In this unit, students will understand radical functions and equations.

Enduring Understandings
- Identify the domain and range of radical functions.
- Graph square root and cube root functions.
- Solve radical equations.
- Find inverses of relations and functions.
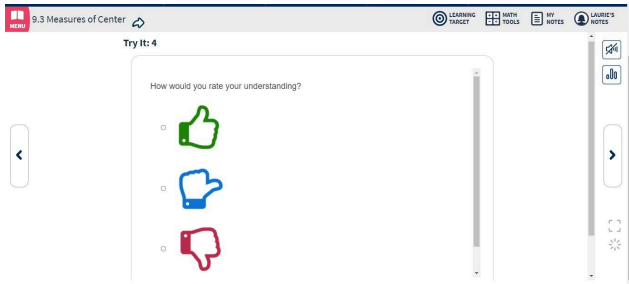
Skill and Knowledge Objectives
- Graph square root and cube root functions.
- Compare square root functions and compare cube root functions using average rates of change.
- Solve radical equations and identify extraneous solutions.
- Solve real-life problems involving square root functions, cube root functions, and radical equations.
- Find inverses of relations, linear functions, and nonlinear functions.

New Jersey Social and Emotional Learning Competencies:
Self-Awareness, Self-Management, Social Awareness, Responsible Decision-Making, Relationship Skills

Activities:

- **Thumbs Up:** Infused in every online lesson presentation tool through Big Ideas website Dynamic Classroom. This technique asks students to indicate the extent to which they understand a concept, procedure, or even the direction of activity. This allows students to communicate their feelings with respect to a specific success criterion.

- **English Language Learners:** English language learners strategies infused in every lesson of Big Ideas Teaching Edition

 - Sample

📑 **Social Emotional Well Being Activities - All Units**

Pre-Assessment:
- Maintaining Mathematical Proficiency (Evaluating Expressions Involving Square Roots and Transforming Linear Functions)

Formative Assessment:
- Mid-Unit Assessments
- Chapter Tests A and B
- Alternative Assessment

- STEAM Performance Task
- Online Quiz (Big Ideas Website)- Teacher selected (based on students needs and abilities)
- Web based (Big Ideas) lesson presentation followed by web based Self Assessment Concepts and Skills and Self Assessment for Problems Solving
- Online (Big Ideas Website) - classwork and homework problems - providing automatic results on accuracy to students and teacher

Self-Reflection/Self-Assessment:
- Student Journal Responses
- Mini-Assessments
- Complete Performance Task after completing this unit of instruction.

Summative Assessment:
- Unit Assessment
- Paper tests - Version A, Version B, or Alternative Assessment (based on students needs and abilities)
- Online Test (Big Ideas Website)- Teacher selected problems (based on students needs and abilities)

Accomodations:

Paper based and pdf worksheets (Big Ideas)
- Cumulative practice
- Vocabulary practice
- Prerequisite skills practice
- Extra practice
- Reteach
- Enrichment and Extension
- Puzzle time

Web based practice and assessments
- Practice problems
    - Adjustable time
    - Calculator - 4 function, scientific, or graphing
    - Stepped out video examples
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NJ Student Learning Standards for Mathematics High School - Algebra:

HSA-CED.A.2
A. Create equations that describe numbers or relationships
2. Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.

HSF-IF.B.4
B. Interpret functions that arise in applications in terms of the context
4. For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity

HSF-IF.B.6
B. Interpret functions that arise in applications in terms of the context
6. Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.

HSF-IF.C.7b
C. Analyze functions using different representations
7. Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.
b. Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.

HSF-IF.C.9
C. Analyze functions using different representations
9. Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). For example, given a graph of one quadratic function and an algebraic expression for another, say which has the larger maximum.

HSA-CED.A.1
A. Create equations that describe numbers or relationships
1. Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions.

HSF-BF.B.4a
B. Build new functions from existing functions
4. Find inverse functions. a. Solve an equation of the form $f(x) = c$ for a simple function f that has an inverse and write an expression for the inverse. For example, $f(x) = 2x^3$ or $f(x) = (x+1)/(x-1)$ for $x \neq 1$.

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A. Critical Thinking and Problem Solving

9.1.8.A.1 Develop strategies to reinforce positive attitudes and productive behaviors that impact critical thinking and problem-solving skills.
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9.1.8.A.3 Summarize strategies used by various organizations and agencies to solve problems that impact communities, and compare them with strategies used by similar organizations in another state or country.
9.1.8.A.4 Design and implement a project management plan using one or more problem-solving strategies.

B. Creativity and Innovation

9.1.8.B.1 Use multiple points of view to create alternative solutions.
9.1.8.B.2 Assess data gathered to solve a problem for which there are varying perspectives (e.g., cross-cultural, gender-specific, generational), and determine how the data can best be used to design multiple solutions.
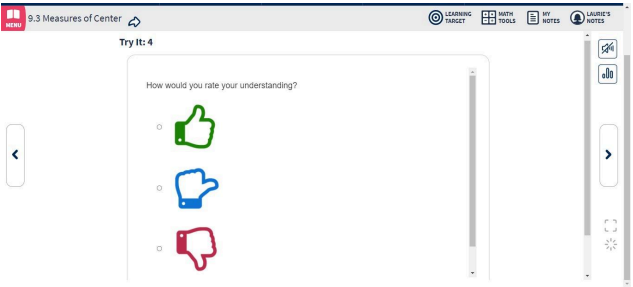
C. Collaboration, Teamwork, and Leadership

9.1.8.C.1 Determine an individual's responsibility for personal actions and contributions to group activities.
9.1.8.C.2 Demonstrate the use of compromise, consensus, and community building strategies for carrying out different tasks, assignments, and projects.
9.1.8.C.3 Model leadership skills during classroom and extra-curricular activities.

Subject Area: Math
Algebra 1

Unit Name: Data Analysis and Displays	Big Ideas Math	3 weeks

Overview
In this unit, students will understand data.

Enduring Understandings
- Interpret data displays.
- Describe the shapes of data distributions.
- Represent data in different ways.
- Analyze data.

Skill and Knowledge Objectives
- Compare the mean, median, and mode of a data set, find the range and standard deviation of a data set, and identify the effects of transformations on data.
- Interpret and use box-and-whisker plots to represent and compare data sets.
- Describe the shapes of data distributions, use them to choose appropriate measures, and compare data distributions.
- Make and use two-way tables to recognize associations in data by finding marginal, relative, and conditional relative frequencies.
- Classify data as quantitative or qualitative, choose and create appropriate data displays, and analyze misleading graphs.

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Activities:

- **Thumbs Up:** Infused in every online lesson presentation tool through Big Ideas website Dynamic Classroom. This technique asks students to indicate the extent to which they understand a concept, procedure, or even the direction of activity. This allows students to communicate their feelings with respect to a specific success criterion.

- **English Language Learners**: English language learners strategies infused in every lesson of Big Ideas Teaching Edition

English Language Learners

Vocabulary

In this section, students will use inverse (or opposite) operations to solve equations. Students will use addition to solve a subtraction equation and use subtraction to solve an addition equation. Review the pairs of words listed below. Then give students one word of a pair, and ask them to provide the opposite word.

Examples:

product, quotient	add, subtract
multiply, divide	plus, minus
positive, negative	sum, difference
odd, even	

- Sample

📄 **Social Emotional Well Being Activities - All Units**

Pre-Assessment:
- Maintaining Mathematical Proficiency (Displaying Data)

Formative Assessment:
- Mid-Unit Assessments
- Chapter Tests A and B
- Alternative Assessment
- STEAM Performance Task
- Online Quiz (Big Ideas Website)- Teacher selected (based on students needs and abilities)
- Web based (Big Ideas) lesson presentation followed by web based Self Assessment Concepts and Skills and Self Assessment for Problems Solving
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Self-Reflection/Self-Assessment:
- Student Journal Responses
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Summative Assessment:
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Accomodations:

Paper based and pdf worksheets (Big Ideas)
- Cumulative practice
- Vocabulary practice
- Prerequisite skills practice
- Extra practice
- Reteach
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Web based practice and assessments
- Practice problems
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Standards
NJ Student Learning Standards for Mathematics High School - Algebra:

HSS-ID.A.3

A. Summarize, represent, and interpret data on a single count or measurement variable
3. Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).
HSS-ID.A.1
A. Summarize, represent, and interpret data on a single count or measurement variable 1. Represent data with plots on the real number line (dot plots, histograms, and box plots).
HSS-ID.A.2
A. Summarize, represent, and interpret data on a single count or measurement variable
2. Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets.
HSS-ID.B.5
B. Summarize, represent, and interpret data on two categorical and quantitative variables
5. Summarize categorical data for two categories in two-way frequency tables. Interpret relative frequencies in the context of the data (including joint, marginal, and conditional relative frequencies). Recognize possible associations and trends in the data.

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