**Course Design**

In Algebraic Reasoning, students build on the knowledge and skills for mathematics in Kindergarten-Grade 8 and Algebra I, continue with the development of mathematical reasoning related to algebraic understandings and processes, and deepen a foundation for studies in subsequent mathematics courses. Students will broaden their knowledge of functions and relationships, including linear, quadratic, square root, rational, cubic, cube root, exponential, absolute value, and logarithmic functions. Students study these functions through analysis and application that includes explorations of patterns and structure, number and algebraic methods, and modeling from data using tools that build to workforce and college readiness such as probes, measurement tools, and software tools, including spreadsheets.

Statements that contain the word "including" reference content that must be mastered, while those containing the phrase "such as" are intended as possible illustrative examples.

The prerequisite for enrollment in Algebraic Reasoning is Algebra I.

<table>
<thead>
<tr>
<th>Unit</th>
<th># Class Periods</th>
<th>Texas Essential Knowledge and Skills/Student Expectations (TEKS/SEs)</th>
</tr>
</thead>
</table>

The Mathematical Process Standards are integrated throughout the course in all activities and lessons. Teachers should refer to these standards for instructional strategies and depth of rigor. Specific process standards have been highlighted for each unit, but these process standards should not be the only process standards associated with the daily lessons.

**Mathematical Process Standards.** The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:

- **ALGR.1A** Apply mathematics to problems arising in everyday life, society, and the workplace.
- **ALGR.1B** Use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution.
- **ALGR.1C** Select tools, including real objects, manipulatives, paper and pencil, and technology as appropriate, and techniques, including mental math, estimation, and number sense as appropriate, to solve problems.
- **ALGR.1D** Communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate.
- **ALGR.1E** Create and use representations to organize, record, and communicate mathematical ideas.
- **ALGR.1F** Analyze mathematical relationships to connect and communicate mathematical ideas.
- **ALGR.1G** Display, explain, and justify mathematical ideas and arguments using precise mathematical language in written or oral communication.
The recommended number of class periods is less than the number of days in the grading cycle to accommodate differentiated instruction, extended learning time, and assessment days. Complete instructional planning information and support are in the HISD Curriculum documents.

<table>
<thead>
<tr>
<th>Cycle 1</th>
<th>29 Days</th>
<th>Aug. 26 - Oct. 4, 2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unit 1: Linear Functions</td>
<td># Class Periods</td>
<td>Texas Essential Knowledge and Skills/Student Expectations (TEKS/SEs)</td>
</tr>
<tr>
<td>Students identify a linear function from its finite differences and write the function rule. Students analyze and compare key attributes of linear, quadratic, and absolute value functions.</td>
<td>11 class periods (90-min. each) or 22 class periods (45-min. each)</td>
<td>The bold face words in the TEKS/SEs indicate concepts addressed specifically in this unit; the unbolded concepts are addressed in other units of this course.</td>
</tr>
</tbody>
</table>

**Part 1: Writing and Analyzing Linear Functions** (9 45-minute lessons)

**Patterns and structure.** The student applies mathematical processes to connect finite differences or common ratios to attributes of functions. The student is expected to:

- **ALGR.2A** Determine the patterns that identify the relationship between a function and its common ratio or related finite differences as appropriate, including linear, quadratic, cubic, and exponential functions.
- **ALGR.2B** Classify a function as linear, quadratic, cubic, and exponential when a function is represented tabularly using finite differences or common ratios as appropriate.
- **ALGR.2C** Determine the function that models a given table of related values using finite differences and its restricted domain and range.

**Patterns and Structure.** The student applies mathematical processes to understand the connections among representations of functions and combinations of functions, including the constant function, \( f(x) = x \), \( f(x) = x^2 \), and \( f(x) = \sqrt{x} \). 

- \( f(x) = \sqrt{x} \), \( f(x) = \sqrt{x} \) \( f(x) = x^3 \), \( f(x) = \sqrt{x} \), \( f(x) = b^x \), \( f(x) = |x| \), and \( f(x) = \log_b(x) \) where \( b \) is 10 or e; functions and their inverses; and **key attributes of these functions.** The student is expected to:
- **ALGR.3B** Compare and contrast the key attributes of a function and its inverse when it exists, including domain, range, maxima, minima, and intercepts, tabularly, graphically, and symbolically.
- **ALGR.3C** Verify that two functions are inverses of each other tabularly and graphically such as situations involving compound interest and interest rate, velocity and braking distance, and Fahrenheit-Celsius conversions.

**Modeling from Data.** The student applies mathematical processes to analyze and model data based on real-world situations with corresponding functions. The student is expected to:
- **ALGR.7A** Represent domain and range of a function using interval notation, inequalities, and set (builder) notation.

**Part 2: Absolute Value Functions** (4 45-minute lessons)

**Patterns and structure.** The student applies mathematical processes to understand the connections among representations of functions and combinations of functions, including the constant function, \( f(x) = x \), \( f(x) = x^2 \), and \( f(x) = \sqrt{x} \). 

- \( f(x) = \sqrt{x} \), \( f(x) = \sqrt{x} \) \( f(x) = x^3 \), \( f(x) = \sqrt{x} \), \( f(x) = b^x \), \( f(x) = |x| \), and \( f(x) = \log_b(x) \) where \( b \) is 10 or e; functions and their inverses; and **key attributes of these functions.** The student is expected to:
- **ALGR.3A** Compare and contrast the key attributes, including domain, range, maxima, minima, and intercepts, of a set of functions such as a set comprised of a linear, a quadratic, and an exponential function or a set comprised of an absolute value, a quadratic, and a square root function tabularly, graphically, and symbolically.
### Scope and Sequence

**Mathematics – Algebraic Reasoning**

**Cycle 1**

<table>
<thead>
<tr>
<th>Unit</th>
<th># Class Periods</th>
<th>29 Days</th>
<th>Aug. 26 - Oct. 4, 2019</th>
</tr>
</thead>
</table>

**Texas Essential Knowledge and Skills/Student Expectations (TEKS/SEs)**

The bold face words in the TEKS/SEs indicate concepts addressed specifically in this unit; the unbolded concepts are addressed in other units of this course.

**The student will:**

- **ALGR.3B** Compare and contrast the key attributes of a function and its inverse when it exists, including domain, range, maxima, minima, and intercepts, tabularly, graphically, and symbolically.
- **ALGR.3C** Verify that two functions are inverses of each other tabularly and graphically such as situations involving compound interest and interest rate, velocity and braking distance, and Fahrenheit-Celsius conversions.

**Modeling from Data.** The student applies mathematical processes to analyze and model data based on real-world situations with corresponding functions. The student is expected to:

- **ALGR.7A** Represent domain and range of a function using interval notation, inequalities, and set (builder) notation.

---

**Part 3: Analyzing Quadratic Functions** (9 45-minute lessons)

**Patterns and Structure.** The student applies mathematical processes to connect finite differences or common ratios to attributes of functions. The student is expected to:

- **ALGR.2A** Determine the patterns that identify the relationship between a function and its common ratio or related finite differences as appropriate, including linear, quadratic, cubic, and exponential functions.
- **ALGR.2B** Classify a function as linear, quadratic, cubic, and exponential when a function is represented tabularly using finite differences or common ratios as appropriate.

**Patterns and Structure.** The student applies mathematical processes to understand the connections among representations of functions and combinations of functions, including the constant function, \( f(x) = x \), \( f(x) = x^2 \),

- \( f(x) = \sqrt{x} \), \( f(x) = \frac{1}{x} \), \( f(x) = x^3 \), \( f(x) = \sqrt[3]{x} \), \( f(x) = b^x \), \( f(x) = |x| \), and \( f(x) = \log_b (x) \)

where \( b \) is 10 or e; functions and their inverses; and key attributes of these functions. The student is expected to:

- **ALGR.3A** Compare and contrast the key attributes, including domain, range, maxima, minima, and intercepts, of a set of functions such as a set comprised of a linear, a quadratic, and an exponential function or a set comprised of an absolute value, a quadratic, and a square root function tabularly, graphically, and symbolically.
- **ALGR.3B** Compare and contrast the key attributes of a function and its inverse when it exists, including domain, range, maxima, minima, and intercepts, tabularly, graphically, and symbolically.

**Modeling from Data.** The student applies mathematical processes to analyze and model data based on real-world situations with corresponding functions. The student is expected to:

- **ALGR.7A** Represent domain and range of a function using interval notation, inequalities, and set (builder) notation.
## Mathematics – Algebraic Reasoning

### Cycle 2: 24 Days  
Oct. 7 - Nov. 8, 2019

<table>
<thead>
<tr>
<th>Unit</th>
<th># Class Periods</th>
<th>Student Expectations</th>
</tr>
</thead>
</table>
| Unit 2: Representing Functions | 3 class periods (90-min. each) or 6 class periods (45-min. each) | Patterns and Structure. The student applies mathematical processes to understand the connections among representations of functions and combinations of functions, including the constant function, \( f(x) = x \), \( f(x) = x^2 \), \( f(x) = \sqrt{x} \), \( f(x) = \frac{1}{x} \), \( f(x) = x^0 \), \( f(x) = b^x \), \( f(x) = |x| \), and \( f(x) = \log_b (x) \) where \( b \) is 10 or \( e \); functions and their inverses; and key attributes of these functions. The student is expected to: 
- **ALGR.3D** Represent a resulting function tabularly, graphically, and symbolically when functions are combined or separated using arithmetic operations such as combining a 20% discount and a 6% sales tax on a sale to determine \( h(x) \), the total sale, \( f(x) = 0.8x \), \( g(x) = 0.06(0.8x) \), and \( h(x) = f(x) + g(x) \).
- **ALGR.3E** Model a situation using function notation when the output of one function is the input of a second function such as determining a function \( h(x) = g(f(x)) = 1.06(0.8x) \) for the final purchase price, \( h(x) \) of an item with price \( x \) dollars representing a 20% discount, \( f(x) = 0.8x \) followed by a 6% sales tax, \( g(x) = 1.06x \).
- **ALGR.3F** Compare and contrast a function and possible functions that can be used to build it tabularly, graphically, and symbolically such as a quadratic function that results from multiplying two linear functions. |

| Unit 3: Matrices and systems of Linear Equations | 6.5 class periods (90-min. each) or 13 class periods (45-min. each) | Part 1: Matrix Operations (6 45-minute lessons) 
**Number and Algebraic Methods.** The student applies mathematical processes to represent, simplify, and perform operations on matrices and to solve systems of equations using matrices. The student is expected to: 
- **ALGR.5A** Add and subtract matrices.
- **ALGR.5B** Multiply matrices.
- **ALGR.5C** Multiply matrices by a scalar. |

Part 2: Represent and Solve Systems of Linear Equations with Matrices and Technology (7 45-minute lessons) 
**Number and Algebraic Methods.** The student applies mathematical processes to represent, simplify, and perform operations on matrices and to solve systems of equations using matrices. The student is expected to: 
- **ALGR.5D** Represent and solve systems of two linear equations arising from mathematical and real-world situations using matrices.
- **ALGR.5E** Represent and solve systems of three linear equations arising from mathematical and real-world situations using matrices and technology. |
Unit 4: Functions and their Inverses

Students identify a cubic and exponential functions from its finite differences or common ratio and write the function rule. Students analyze and compare key attributes of cubic, and exponential functions.

<table>
<thead>
<tr>
<th>Unit</th>
<th># Class Periods</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>10 class periods (90-min. each) or 20 class periods (45-min. each)</td>
</tr>
</tbody>
</table>

Part 1: Cubic and Square Root Functions (10 45-minute lessons)

Patterns and structure. The student applies mathematical processes to connect finite differences or common ratios to attributes of functions. The student is expected to:

- **ALGR.2A** Determine the patterns that identify the relationship between a function and its common ratio or related finite differences as appropriate, including linear, quadratic, cubic, and exponential functions.
- **ALGR.2B** Classify a function as linear, quadratic, cubic, and exponential when a function is represented tabularly using finite differences or common ratios as appropriate.
- **ALGR.2C** Determine the function that models a given table of related values using finite differences and its restricted domain and range.
- **ALGR.2D** Determine a function that models real-world data and mathematical contexts using finite differences such as the age of a tree and its circumference, figurative numbers, average velocity, and average acceleration.

Patterns and Structure. The student applies mathematical processes to understand the connections among representations of functions and combinations of functions, including the constant function, \( f(x) = x, f(x) = x^2 \), \( f(x) = \sqrt{x}, f(x) = x^3, f(x) = \frac{1}{x} \), \( f(x) = x^4, f(x) = |x|, \) and \( f(x) = \log_b(x) \) where \( b \) is 10 or \( e \); functions and their inverses; and key attributes of these functions. The student is expected to:

- **ALGR.3A** Compare and contrast the key attributes, including domain, range, maxima, minima, and intercepts, of a set of functions such as a set comprised of a linear, a quadratic, and an exponential function or a set comprised of an absolute value, a quadratic, and a square root function tabularly, graphically, and symbolically.
- **ALGR.3B** Compare and contrast the key attributes of a function and its inverse when it exists, including domain, range, maxima, minima, and intercepts, tabularly, graphically, and symbolically.
- **ALGR.3C** Verify that two functions are inverses of each other tabularly and graphically such as situations involving compound interest and interest rate, velocity and braking distance, and Fahrenheit-Celsius conversions.

Modeling from Data. The student applies mathematical processes to analyze and model data based on real-world situations with corresponding functions. The student is expected to:

**ALGR.7A** Represent domain and range of a function using interval notation, inequalities, and set (builder) notation.
**Cycle 3**  
**24 Days**  
**Nov. 11-Dec. 19, 2019**

The recommended number of class periods is less than the number of days in the grading cycle to accommodate differentiated instruction, extended learning time, and assessment days. Complete instructional planning information and support are in the HISD Curriculum documents.

<table>
<thead>
<tr>
<th>Unit</th>
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<td></td>
<td></td>
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</tbody>
</table>

**Texas Essential Knowledge and Skills/Student Expectations (TEKS/SEs)**

The **bold face** words in the TEKS/SEs indicate concepts addressed specifically in this unit; the unbolded concepts are addressed in other units of this course. The student will:

**Part 2: Exponential and Logarithmic Functions** (10 45-minute lessons)

**Patterns and structure.** The student applies mathematical processes to connect finite differences or common ratios to attributes of functions. The student is expected to:

- **ALGR.2A** Determine the patterns that identify the relationship between a function and its common ratio or related finite differences as appropriate, including linear, quadratic, cubic, and exponential functions.
- **ALGR.2B** Classify a function as linear, quadratic, cubic, and exponential when a function is represented tabularly using finite differences or common ratios as appropriate.

**Patterns and Structure.** The student applies mathematical processes to understand the connections among representations of functions and combinations of functions, including the constant function, \( f(x) = x, f(x) = x^2, \)

\[
\begin{align*}
  f(x) &= \sqrt{x}, \quad f(x) = \frac{1}{x}, \quad f(x) = x^3, \quad f(x) = \sqrt[3]{x}, \quad f(x) = b^x, \\
  f(x) &= |x|, \text{ and } f(x) = \log_b(x) \quad \text{where } b \text{ is 10 or } e.
\end{align*}
\]

functions and their inverses; and key attributes of these functions. The student is expected to:

- **ALGR.3A** Compare and contrast the key attributes, including domain, range, maxima, minima, and intercepts, of a set of functions such as a set comprised of a linear, a quadratic, and an exponential function or a set comprised of an absolute value, a quadratic, and a square root function tabularly, graphically, and symbolically.
- **ALGR.3B** Compare and contrast the key attributes of a function and its inverse when it exists, including domain, range, maxima, minima, and intercepts, tabularly, graphically, and symbolically.
- **ALGR.3C** Verify that two functions are inverses of each other tabularly and graphically such as situations involving compound interest and interest rate, velocity and braking distance, and Fahrenheit-Celsius conversions.

**Modeling from Data.** The student applies mathematical processes to analyze and model data based on real-world situations with corresponding functions. The student is expected to:

- **ALGR.7A** Represent domain and range of a function using interval notation, inequalities, and set (builder) notation.
<table>
<thead>
<tr>
<th>Cycle 4</th>
<th>29 Days</th>
<th>The recommended number of class periods is less than the number of days in the grading cycle to accommodate differentiated instruction, extended learning time, and assessment days. Complete instructional planning information and support are in the HISD Curriculum documents.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Unit</strong></td>
<td><strong># Class Periods</strong></td>
<td><strong>Texas Essential Knowledge and Skills/Student Expectations (TEKS/SEs)</strong> The bold face words in the TEKS/SEs indicate concepts addressed specifically in this unit; the unbolded concepts are addressed in other units of this course. The student will:</td>
</tr>
</tbody>
</table>
| **Unit 5: Function Operations** Students add, subtract, and multiply polynomial functions from mathematical and real-world situations. Students compare, contrast, and determine linear factors and quotients of polynomial functions. | 12.5 class periods (90-min. each) or 23 class periods (45-min. each) | **Part 1: Add, Subtract, Multiply of Polynomial Functions** (11 45-minute lessons) **Patterns and Structure.** The student applies mathematical processes to understand the connections among representations of functions and combinations of functions, including the constant function, \( f(x) = x \), \( f(x) = x^2 \), \( f(x) = \frac{1}{x} \), \( f(x) = x^3 \), \( f(x) = x^4 \), \( f(x) = \sqrt{x} \), \( f(x) = \sqrt[3]{x} \), and \( f(x) = \log_b(x) \) where \( b \) is 10 or \( e \); functions and their inverses; and key attributes of these functions. The student is expected to:  
• **ALGR.3F** Compare and contrast a function and possible functions that can be used to build it tabularly, graphically, and symbolically such as a quadratic function that results from multiplying two linear functions. **Number and Algebraic Methods.** The student applies mathematical processes to simplify and perform operations on functions represented in a variety of ways, including real-world situations. The student is expected to:  
• **ALGR.4A** Connect tabular representations to symbolic representations when adding, subtracting, and multiplying polynomial functions arising from mathematical and real-world situations such as applications involving surface area and volume.  
• **ALGR.4B** Compare and contrast the results when adding two linear functions and multiplying two linear functions that are represented tabularly, graphically, and symbolically.  
**Part 2: Linear Factors and Quotients of Polynomial Functions** (12 45-minute lessons) **Number and Algebraic Methods.** The student applies mathematical processes to simplify and perform operations on functions represented in a variety of ways, including real-world situations. The student is expected to:  
• **ALGR.4C** Determine the quotient of a polynomial function of degree three and of degree four when divided by a polynomial function of degree one and of degree two when represented tabularly and symbolically.  
• **ALGR.4D** Determine the linear factors of a polynomial function of degree two and of degree three when represented symbolically and tabularly and graphically where appropriate. |
## Cycle 5

**29 Days**
Feb. 17 - Apr. 3, 2020

The recommended number of class periods is less than the number of days in the grading cycle to accommodate differentiated instruction, extended learning time, and assessment days. Complete instructional planning information and support are in the HISD Curriculum documents.

<table>
<thead>
<tr>
<th>Unit</th>
<th># Class Periods</th>
<th>Texas Essential Knowledge and Skills/Student Expectations (TEKS/SEs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unit 6: Solutions and their Meaning</td>
<td>11.5 class periods (90-min. each) or 23 class periods (45-min. each)</td>
<td>The bold face words in the TEKS/SEs indicate concepts addressed specifically in this unit; the unbolded concepts are addressed in other units of this course. The student will:</td>
</tr>
</tbody>
</table>

### Part 1: Solutions of Linear, Quadratic, and Rational Equations (8 45-minute lessons)

**Number and Algebraic Methods.** The student applies mathematical processes to estimate and determine solutions to equations resulting from functions and real-world applications with fluency. The student is expected to:

- **ALGR.6A** Estimate a reasonable input value that results in a given output value for a given function, including quadratic, rational, and exponential functions.
- **ALGR.6B** Solve equations arising from questions asked about functions that model real-world applications, including linear and quadratic functions, tabularly, graphically, and symbolically.

### Part 2: Solutions of Cubic and Square Root Equations (7 45-minute lessons)

**Number and Algebraic Methods.** The student applies mathematical processes to estimate and determine solutions to equations resulting from functions and real-world applications with fluency. The student is expected to:

- **ALGR.6A** Estimate a reasonable input value that results in a given output value for a given function, including quadratic, rational, and exponential functions.
- **ALGR.6C** Approximate solutions to equations arising from questions asked about exponential, logarithmic, square root, and cubic functions that model real-world applications tabularly and graphically.

### Part 3: Solutions of Exponential and Logarithmic Equations (8 45-minute lessons)

**Number and Algebraic Methods.** The student applies mathematical processes to estimate and determine solutions to equations resulting from functions and real-world applications with fluency. The student is expected to:

- **ALGR.6A** Estimate a reasonable input value that results in a given output value for a given function, including quadratic, rational, and exponential functions.
- **ALGR.6C** Approximate solutions to equations arising from questions asked about exponential, logarithmic, square root, and cubic functions that model real-world applications tabularly and graphically.
## Scope and Sequence
### Mathematics – Algebraic Reasoning

The recommended number of class periods is less than the number of days in the grading cycle to accommodate differentiated instruction, extended learning time, and assessment days.

Complete instructional planning information and support are in the HISD Curriculum documents.

### Cycle 6

<table>
<thead>
<tr>
<th>Unit</th>
<th># Class Periods</th>
<th>Texas Essential Knowledge and Skills/Student Expectations (TEKS/SEs)</th>
</tr>
</thead>
</table>
| Unit 7: Analyzing Real-World Models | 15 class periods (90-min. each) or 30 class periods (45-min. each) | **Part 1: Linear and Exponential Models** (16 45-minute lessons)  
**Modeling from Data.** The student applies mathematical processes to analyze and model data based on real-world situations with corresponding functions. The student is expected to:  
- **ALGR.7A** Represent domain and range of a function using interval notation, inequalities, and set (builder) notation.  
- **ALGR.7B** Compare and contrast between the mathematical and reasonable domain and range of functions modeling real-world situations, including linear, quadratic, exponential, and rational functions.  
- **ALGR.7C** Determine the accuracy of a prediction from a function that models a set of data compared to the actual data using comparisons between average rates of change and finite differences such as gathering data from an emptying tank and comparing the average rate of change of the volume or the second differences in the volume to key attributes of the given model.  
- **ALGR.7D** Determine an appropriate function model, including linear, quadratic, and exponential functions, for a set of data arising from real-world situations using finite differences and average rates of change.  
- **ALGR.7E** Determine if a given linear function is a reasonable model for a set of data arising from a real-world situation. |
| | | **Part 2: Quadratic and Rational Models** (14 45-minute lessons)  
**Modeling from Data.** The student applies mathematical processes to analyze and model data based on real-world situations with corresponding functions. The student is expected to:  
- **ALGR.7A** Represent domain and range of a function using interval notation, inequalities, and set (builder) notation.  
- **ALGR.7B** Compare and contrast between the mathematical and reasonable domain and range of functions modeling real-world situations, including linear, quadratic, exponential, and rational functions.  
- **ALGR.7C** Determine the accuracy of a prediction from a function that models a set of data compared to the actual data using comparisons between average rates of change and finite differences such as gathering data from an emptying tank and comparing the average rate of change of the volume or the second differences in the volume to key attributes of the given model.  
- **ALGR.7D** Determine an appropriate function model, including linear, quadratic, and exponential functions, for a set of data arising from real-world situations using finite differences and average rates of change. |

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**GLOBAL GRADUATE**

- State Process Standard  
- State Readiness Standard  
- Aligned to Upcoming State Readiness Standard  
- State Supporting Standard  

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## Recommended Resources

### Graphing Technology:
- [Desmos](https://www.desmos.com) – a free graphing program
- [GeoGebra](https://www.geogebra.org) – a free and multi-platform dynamic mathematics software involving multiple representations for all levels of mathematics including geometry, algebra, statistics, and calculus
- [TI-84+/TI Nspire Education Technology](https://education.ti.com) – calculator activities for use in this course as a discovery and analytical tool

### Adopted Instructional Materials:
- Pearson, *Algebra 1 and Algebra 2*
- OpenStax, *Algebra 2*

### Online Resources:
*NOTE: for additional web 2.0 tools, access HISD [Instructional Technology Web Tools](https://www.houstonisd.org/itw/tools)*
- [AnalyzeMath](https://www.analysismath.com) – an interactive applet with definitions, examples, and practice exercises
- [Bubbl.us](https://bubbl.us) – a tool for creating graphic organizers and mind maps
- [Creately](https://www.creately.com) – a Venn diagram maker
- [Edmodo](https://www.edmodo.com) – a social communication platform
- Imagine Math – Pathways for Algebra 1 and TSIA; Also, pathways available for SAT and ACT; HUB Digital Resources
- [Khan Academy](https://www.khanacademy.org) – instructional videos and practice exercises
- [Math Warehouse](https://www.mathwarehouse.com) – definitions, examples, and practice exercises
- [Math Open Reference](https://www.mathopenref.com) – free interactive mathematics textbook
- [NCTM Illuminations](https://www.illuminations.nctm.org) – interactive activities
- [OnlineMathLearning](https://www.onlinemathlearning.com) – mathematics help and learning resources
- [Padlet](https://padlet.com) – a tool for classroom collaboration
- [Problem-attic](https://www.probлем-attic.com) – 100,000 questions from NY Regents, State Assessments, Academic Competitions
- [Purple Math](https://www.purplemath.com) – tutorial guides
- [Socrative](https://socrative.com) – interactive games and exercises
- [StudyStack](https://studystack.com) – study aids for vocabulary
- [TeacherTube](https://www.teachertube.com) – instructional videos
- [Virtual Nerd](https://www.virtualnerd.com) – instructional videos
- [Wolfram Demonstrations Project](https://demonstrations.wolfram.com) – an application for mathematics investigations
- [YouTube](https://www.youtube.com) – instructional videos