Mathematics

Algebra I Public Overview

1st 9 Weeks
Assessments
MAP Growth Math: September 2nd – September 3rd

What are we learning?
How can I help at home?

Topic 1: Solving Equations and Inequalities

In this topic, students learn how to write and solve equations with one variable. They practice using algebra to find unknown values and discover that when solving liner one variable equations, the result could be one solution, infinitely many, or no solution. Students also work with literal equations, where they solve for a specific variable in a formula. For example, they might rearrange a formula to find time, rate, or another quantity. This helps them understand how algebra is used in real-world situations. Finally, students study solving linear inequalities, learning how they are similar and different from equations. They find solution sets that include many possible values and represent these solutions on a number line. By the end of the topic, students understand how these ideas connect and work together, giving them a strong foundation for future algebra learning.

Essential Question:

How can we use equations and inequalities to represent, solve, and make sense if rea-world situations?

Timeline: August 11th – August 28th
Essential Standards: A.5A
Link to TEKS/Parent Guide:

- Texas Essential Knowledge and Skills for Mathematics Algebra I
- Topic Family Engagement aligned to the topics are available through the students' digital access.

Content:

- Solve linear one variable equations
- Rearrange equations or formulas to solve for a specific variable
- Solve linear inequalities and represent possible solutions on a number line.
- Understand how algebra is used in real world situations.

At-Home Connection:

- **Earning and spending money:** Have students determine how many hours they would need to work to earn a specific amount of money given their hourly rate.

- **Budgeting and Shopping:** Have students determine how many items they can afford to purchase given a set amount of money, when each item has the same cost.

Topic 2: Linear Equations

In this topic, students will explore how linear relationships work and how to represent them in different ways. They begin by studying direct variation, where two quantities change at a constant rate, and learn to identify the constant of proportionality and write equations to model real-world situations. Next, students learn to write linear equations in three forms: slope-intercept, point-slope, and standard form and choose the most useful form based on the information given.
Finally, students study parallel and perpendicular lines, learning how to write equations for each and how their slopes are related. They use graphing to visualize these relationships and apply their understanding to real-life contexts. Overall, students build a strong foundation in understanding, writing, and applying linear equations.

Essential Question:

How can we represent and analyze linear relationships in different ways to solve real-world problems?

Timeline August 31st – September 29th
Essential Standards: A.2C and A.3C
Link to TEKS/Parent Guide:

- Texas Essential Knowledge and Skills for Mathematics Algebra I
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Content:

- Write and solve direct variation equations
- Write linear equations in different forms.
- Write parallel and perpendicular
- Graph linear equations from different forms.

At-Home Connection:

- **Pay and earnings:** Have students determine how much money they would earn based on an hourly rate and the number of hours worked. This helps them connect direct variation and linear equations to real-world situations.
- **Budgeting and monthly costs:** Discuss situations that involve a starting cost plus a monthly fee, such as streaming services or phone plans. Have students write an equation to represent the total cost and explain what each part of the equation means.
- **Distance and Time:** Have students calculate how far they can travel at a constant speed over different amounts of time. This helps reinforce linear relationships, constant rates of change, and graphing real-world data.

Topic 3: Linear Functions

In this topic, students develop a deep understanding of linear functions and their applications. They learned to recognize linear functions as relationships that assign exactly one output to each input and use function notation to represent and evaluate these relationships. Students will graph linear

functions and identify key features such as slope, x-intercept, zero, and y-intercept. They will also explore how linear functions change through transformations.
Students will apply their understanding of linear functions in a variety of contexts. They will represent arithmetic sequences using linear function rules, analyze scatter plots to determine linear relationships, and used trend lines to model data and evaluate the strength of correlations.
Throughout the unit, students will solve real-world problems involving linear relationships, using mathematical models to make predictions and interpret data in meaningful situations.

Essential Question:

How can linear functions be used to represent, analyze, and make predictions about relationships and real-world situations?

Timeline: September 30th – November 5th
Essential Standards: A.2A, A.3C, A.2C, and A.3B
Link to TEKS/Parent Guide:

- Texas Essential Knowledge and Skills for Mathematics Algebra I
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Content:

- Use and evaluate function notation.
- Determine a reasonable domain and range from mathematical and real-world context.
- Graph linear functions and identify key features.
- Apply and describe transformations of linear functions.
- Write linear rules to represent arithmetic sequences.
- Write and analyze linear functions that best fit data and make predictions.
- Use linear functions to solve real-world problems.

At-Home Connection:

- **Compare costs and savings:** Have students compare cell phone plans or streaming subscriptions to identify linear relationships and discuss how costs change at a constant rate.
- **Explore patterns in daily life:** Ask students to identify arithmetic patterns at home, such as saving a set amount of money each week and represent the pattern with a table, graph, or function rule.
- **Analyze real-world data:** Encourage students to collect and graph data, such as daily temperatures, or screen time, and use a trend line to make predictions and discuss whether the data shows a linear relationship.

2nd 9 Weeks
Assessments Semester Exams: December 15th – December 18th

What are we learning?

How can I help at home?

Topic 3: Linear Functions *(Continued)*

See 1st 9 weeks for details

Topic 4: System of Linear Equations and Inequalities

In this topic, students explore systems of linear equations and inequalities and their real-world applications. They solve systems of linear equations using graphing, substitution, and elimination and understand that the solution represents the point where the equations intersect.
Students also graph linear inequalities and systems of inequalities, using boundary lines and shading to represent solution sets. They identify solutions as the points that satisfy all conditions and apply these concepts to solve real-world problems.

Essential Question:

How do you use systems of linear equations and inequalities to model situations and solve problems?

Timeline: November 6th – December 18th
Essential Standards: A.2I, A.5C, and A.3D
Link to TEKS/Parent Guide:

- Texas Essential Knowledge and Skills for Mathematics Algebra I
- Topic Family Engagement aligned to the topics are available through the students' digital access

Content:

- Write and graph system of linear equations.
- Solve system of linear equations
- Use systems to solve real-world problems and explain the solution context.
- Graph linear equalities.
- Graph system of linear inequalities

At-Home Connection:

- **Compare plans and costs:** Have students compare options such as phone plans, streaming services, or event tickets to determine where costs are equal and explain their reasoning using a system of equations.
- **Use graphs to make decisions:** Encourage students to graph and compare two situations, such as savings goals or fundraising plans, to determine when one option becomes better than another.
- **Explore real-world constraints:** Discuss situations that involve limits, such as budgeting for a shopping trip or planning an event and identify possible solutions using the ideas of inequalities and constraints.

3rd 9 Weeks

Assessments

MAP Growth Math: January 20th – January 21st

What are we learning?
How can I help at home?

Topic 5: Exponents and Exponential Functions

In this topic, students explore exponential functions and their applications. Students will use laws of exponents to simplify expressions. They will also write and graph exponential functions. Students will identify key features of exponential graphs, including the domain, range, y-intercept and horizontal asymptote, and connect geometric sequences to exponential functions. Students also use exponential functions to model and analyze real-world situations, such as population growth and depreciation. They interpret graphs of exponential models to make predictions. Throughout the unit, students use exponential models to describe patterns of growth and decay and solve real-world problems.

Essential Question:

How can we use exponential functions to model situations and solve problems?

Timeline: January 6th – January 29th
Essential Standards: A.11B, A.9B, A.9D
Link to TEKS/Parent Guide:

- Texas Essential Knowledge and Skills for Mathematics Algebra I
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Content:

- Use the laws of exponents to simplify expressions.
- Write and graph exponential functions.
- Identify the domain, range, y-intercept, and horizontal asymptote of an exponential function.
- Connect geometric sequences to exponential functions.
- Interpret exponential graphs and make predictions.
- Use exponential functions to model real-world situations.
- Solve real-world problems involving exponential functions.

At-Home Connection:

- **Track growth and decay:** Have students investigate real-world examples of exponential growth and decay, such as savings account earning interest, population growth, or the decreasing value of a car over time.
- **Look for patterns:** Encourage students to identify geometric patterns at home, such as doubling a recipe or folding paper and describing the pattern using an exponential model.
- **Make predictions:** Ask students to analyze a graph, table, or online data set and predict future values using exponential growth or decay reasoning, then discuss whether the prediction seems reasonable.

Topic 6: Polynomials and Factoring

In this unit, students explore polynomials and their operations. They classify monomials and polynomials and use the properties of operations to add, subtract, and multiply polynomials. Students apply Distributive Property, area models, and patterns to multiply binomials and recognize special products, such as the square of a binomial and the difference of two squares.
Students also develop strategies for factoring polynomials. They factor out the greatest common factor, factor quadratic trinomials, and recognize special factoring patterns, including perfect square trinomials and differences of two squares. Finally, students use factoring to simplify rational expressions and divide polynomials, while identifying any restrictions on variable values. Throughout the unit, students build fluency with polynomial operations and use multiple representations to solve mathematical problems.

Essential Question:

How do you work with polynomials to rewrite expressions and solve problems?

Timeline: February 1st – March 4th
Essential Standards: A.10E
Link to TEKS/Parent Guide:

- Texas Essential Knowledge and Skills for Mathematics Algebra I
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Content:

- Classify and identify monomials and polynomials.
- Add, subtract, and multiply polynomials.
- Factor quadratic trinomials.
- Factor perfect square trinomials and differences of two squares.
- Divide polynomials.
- Use polynomial operations and factoring to solve mathematical problems.

At-Home Connection:

- **Practice area models:** Have students use graph paper, sticky notes, or rectangular objects to model multiplication and factoring, making connections between area and polynomial operations.
- **Solve puzzles and games:** Engage students in logic puzzles, number puzzles, or strategy games that require recognizing patterns, simplifying expressions, or finding factors, helping reinforce algebraic thinking.

4th 9 Weeks
Assessments STAAR EOC Algebra I (April 26 – April 28) MAP Growth Math: May 5th – May 6th

What are we learning?
How can I help at home?

Topic 7: Quadratic Functions

In this topic, students explore quadratic functions and their applications. They investigate how changes to the parameter "a" affect the shape and direction of a parabola and use vertex form and standard form to graph and analyze quadratic functions. Students identify key features of quadratic graphs, including the vertex, axis of symmetry, maximum or minimum value, intercepts, domain, and range. Students apply quadratic functions to model and solve real-world problems, such as area and vertical motion situations. They use quadratic regression to find equations that best fit data and make predictions. Students also compare different types of functions and explore how transformations, stretches, and compressions affect graphs.

Essential Question:

How can you use graphs and equations of quadratic functions to model situations and make predictions.

Timeline: March 15th – April 7th
Essential Standards: A.7A, A.7C, A.6A and A.2A
Link to TEKS/Parent Guide:

- Texas Essential Knowledge and Skills for Mathematics Algebra I
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Content:

- Graph quadratic functions in vertex form and standard form.
- Identify key features of a quadratic function, including the vertex, axis of symmetry, intercepts, maximum or minimum, domain, and range.
- Describe how changes to a quadratic function affect its graph.
- Model and solve real-world problems using quadratic functions.
- Use quadratic regression to find a quadratic model for data.
- Compare quadratic functions using their key features.
- Graph and analyze transformations of functions.

At-Home Connection:

- **Explore parabolic paths:** Have students observe examples of quadratic relationships in sports, such as the path of a basketball shot or a tossed ball and discuss the highest point and overall shape of the path.

Topic 8: Solving Quadratic Equations

In this topic, students develop a deep understanding of how to solve quadratic equations using multiple methods and determine which strategy is most efficient for a given problem. Students begin by using tables and graphs to identify solutions and connect them to the x-intercepts of a parabola. They then solve quadratic equations algebraically by factoring, taking square roots, completing the square, and applying the quadratic formula to find exact solutions. Students learn that different quadratic equations may require different solution methods, and they build confidence in selecting and using the appropriate strategy. Through these experiences, students strengthen their algebraic

reasoning, make connections between graphical and algebraic representations, and develop problem-solving skills that prepare them for more advanced mathematics.

Essential Question:

How can graphical and algebraic methods be used to solve quadratic equations, and when is one method more efficient than another?

Timeline: April 8th – May 7th
Essential Standards: A.8A
Link to TEKS/Parent Guide:

- Texas Essential Knowledge and Skills for Mathematics Algebra I
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Content:

- Identify solutions to Quadratic equations using tables and graphs.
- Solve Quadratic equations by factoring.
- Solve Quadratic equations by square root method.
- Solve Quadratic equations by completing the square.
- Solve quadratic equations by using quadratic formula.
- Select the best method for solving a quadratic equation.
- Connect quadratic equations to its graph.
- Check and justify my solutions.

At-Home Connection:

- **Compare Solution Methods:** Have your child show you two different ways to solve the same quadratic equation and explain why one method may be more efficient.
- **Check Solutions Together:** Encourage your child to substitute their solutions back into the original equation to verify that their answers are correct.

Topic 9: Solving Re-enforcement

In this unit, students extend their understanding of solving linear equations and inequalities while reinforcing algebraic skills learned throughout the year. They build on their ability to find unknown values, analyze solution sets by applying similar reasoning to more complex quadratic equations. Students use multiple strategies—including graphs, factoring, square roots, completing the square, and the quadratic formula—to solve quadratic equations and determine the most efficient method for a given problem. Through these experiences, students strengthen their problem-solving skills, make connections between algebraic and graphical representations, and deepen their understanding of how equations and inequalities can be used to model and solve real-world situations.

Essential Question:

How can we apply and extend our understanding of linear equations, inequalities, and quadratic equations to solve problems and justify our solutions?

Timeline: May 10th – May 27th
Essential Standards: A.5A, A.8A
Link to TEKS/Parent Guide:

- Texas Essential Knowledge and Skills for Mathematics Algebra I
- Topic Family Engagement aligned to the topics are available through the students' digital access

Content:

- Solve linear equations and determine whether they will have one solution, infinitely many, or no solution.
- Solve and represent the solution set to linear inequalities.
- Use tables and graphs to find solutions to quadratic equations.
- Solve quadratic equations by factoring, completing the square, square root method, and quadratic formula.
- Select an efficient strategy on solving quadratic equations.
- Check and justify solutions.

At-Home Connection:

- **Compare Solution Methods:** Have your child show you two different ways to solve the same quadratic equation and explain why one method may be more efficient.
- **Check Solutions Together:** Encourage your child to substitute their solutions back into the original equation to verify that their answers are correct.
- **Budgeting and Shopping:** Have students determine how many items they can afford to purchase given a set amount of money, when each item has the same cost.