## First & Third Nine Weeks

### Functions (Chapter 1)
- Use real number properties to simplify and evaluate algebraic expressions and to write equivalent expressions.
- Recognize and apply real-world functions in a variety of representations and translate among verbal, tabular, graphic, and algebraic representations of functions including the use of function notation, \( f(n) \).
- Use function notation to evaluate a function for a specific value.
- Recognize an example of a function; identify the role of independent and dependent variables in a function; determine the domain and range (input/output) of a linear function.
- Recognize even and odd functions from their graphs and algebraic expressions.

### Linear Relationships (Chapter 2)
- Represent a given tile pattern with words, in a table, with a graph or with an equation and identify how they are equivalent.
- Model algebraic expressions in a variety of ways (Examples: using algebraic tiles, sketches/diagrams, bar models).
- Create and differentiate rules for patterns.
- Explain how the change in one variable affects the change in another variable.
- Solve problems that involve interpreting slope as a rate of change.
- Describe how the aspects of the function such as the dependent and independent variables and slope and \( y \)-intercept are reflected in the different representations.
- Graph and analyze linear functions.
- Write equations of lines given a variety of information. (Examples: given a graph, two points, point and slope, slope and \( y \)-intercept and/or situation.)
- Write equations in slope-intercept form.
- Find the \( x \)- and \( y \)-intercepts of a linear function and interpret its meaning.
- Compare steeper and horizontal slopes.

### Simplifying and Solving (Chapter 3)
- Understand and justify laws of exponents.
- Extend basic rules of exponents to simplify/rewrite expressions that include negatives, zeros, and fractions as exponents.
- Add, subtract, multiply, and divide polynomial expressions.
- Represent polynomial operations with area models.
- Understand the definition and importance of the terms coefficient and degree.
- Arrange polynomial expressions in ascending and descending order in terms of a specific variable.
- Simplifying expressions with distributive property and combining like terms.
- Define a variable, write, solve, and graph equation, and interpret the solution given a mathematical situation or real-world situation.
- Solve equations that involve fractions by rewriting and solving an equivalent equation (Fraction Busters).
- Model algebraic equations in a variety of ways (Examples: using algebra tiles, sketches/diagrams, bar models) and will identify and create equivalent equations.
- Use real number properties (identity, inverse, commutative, associative, distributive) to justify steps in solving equations.
- Solve, check, and graph multi-step linear equations in one and two-variable with distributive property including rational coefficients in mathematical and real-world situations and interpret the solution.
- Solve formulas and equations for a specific variable.
- Solve, graph and analyze absolute value equations in one variable.
### System of Equations (Chapter 4)
- Given a mathematical or real-world situation, define the variables and write an appropriate system of linear equations.
- Use tables and graphs to find and interpret solutions to systems of equations in mathematical and real-world contexts.
- Apply the concept of slope to determine if lines in a plane are parallel or perpendicular.
- Use algebraic and graphical methods to solve systems of linear equations in mathematical and real-world situations.
  (Methods should include, but are not limited to Elimination and Graphing.)

### Sequences (Chapter 5)
- Extend patterns based on arithmetic and geometric sequences, given specified initial terms and patterns of change.
- Find the value of missing term(s) in a sequence.
- Solve mathematical and problems in mathematical settings involving arithmetic and geometric sequences.
- Use proper notation for arithmetic and geometric sequences and develop formulas for the $n^{th}$ term.
- Write sequences for explicit expressions or steps for calculation from a context.
- Write explicit expressions for arithmetic and geometric sequences.
- Compare patterns of growth in linear and exponential tables.
- Find equations for geometric sequences and see relationships between geometric sequences and exponential functions.
- Use geometric sequences to solve problems involving percent increase and decrease.
- Recognize that all sequences are functions with domains limited to positive integers.

### Exponential Functions (Chapter 7)
- Identify and interpret graphs and tables of exponential functions.
- Use the parent function $y = a \cdot b^x$ to describe and predict the effects of parameter changes on graphs of exponential functions.
- Compare and contrast linear and exponential models.
- Describe the role of the parameters in context.
- Write and use models for exponential growth and decay.
- Identify the key characteristics of exponential functions including domain, range, intercepts, and shape.
- Solve exponential equations.
- Solve application problems involving exponential functions related to growth and decay.
- Solve real-world problems involving simple and compound interest and investigate the relationship between the two.
- Create multiple representations of exponential functions including a table, equation, graph, and situation and solidify their connection.
- Find equations of exponential functions by using known quantities to solve for missing parameter (for example, given two points, initial value and point).

### Essential Focus:
Describe graphs including linear, quadratic, absolute value, and exponential functions, using key words such as intercepts, minima, maxima, vertex, symmetry, intervals where the function is increasing, decreasing, positive or negative and determine the domain and range of such functions.

### Note:
**Case 21 Window**
- Fall 2019: September 30-October 8
- Spring 2020: February 24-March 6

### Second & Fourth Nine Weeks

#### Quadratic Functions (Chapter 8)
- Identify and interpret graphs and tables of quadratic functions.
- Determine the solutions to quadratic equations by using a variety of solution methods including graphing, tables, completing the square, and factoring (limit to 1st- and 2nd-degree polynomials).
- Model situations with quadratic functions and apply these functions to real-world situations.
- Identify the key characteristics of quadratic functions, including domain, range, intercepts, vertex and shape.
- Translate among equivalent forms of quadratic functions (for example, Standard form: $ax^2 + bx + c$, Factored form: $a(x + b)(x + c)$, and Graphing form: $a(x - h)^2 + k$).
- Understand the relationship between factors and roots.
- Justify why some polynomials are prime over the rational number system.
### Algebra I (Semester) Pacing Guide

- Identify connections between different representations of quadratics: equation, a table, a situation, and graph.
- Find and/or identify the vertex of a parabola given a graph, equation, or table.
- Use the Zero Property to find the roots of the quadratic functions.
- Use the Quadratic Formula to solve quadratic equations.
- Recognize when the quadratic formula gives complex solutions.

#### Solving Quadratics and Inequalities (Chapter 9)

- Write, graph, and analyze one-variable inequalities in mathematical and real-world situations.
- Solve, check, and graph multi-step linear inequalities with distributive property including rational coefficients in mathematical and real-world situations and interpret the solution.
- Write, graph, and analyze two-variable inequalities in mathematical and real-world situations.
- Given a mathematical or real-world situation, define the variables and write an appropriate system of linear inequalities.
- Use algebraic and graphical methods to solve systems of linear inequalities in mathematical and real-world situations.
- Solve and graph absolute value inequalities with one variable.

#### Functions and Data (Chapter 11)

- Add or multiply by a constant to transform linear, quadratic, and exponential functions.
- Identify the effect on the graph (in vertex form) by replacing \( f(x) \) by \( f(x) + k, k f(x), f(kx), \) and \( f(x + k) \) for specific values of \( k \).
- Graph square root and piecewise-defined functions, including absolute value functions.
- Calculate probabilities and determine association from data arranged in two-way tables.
- Create relative frequency tables.
- Represent and analyze data with plots on the real number line (dot plots, histograms, and box plots)
- 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.
- Compute (using technology) and interpret the correlation coefficient of a linear fit. Distinguish between correlation and causation.

#### Statistics* (Chapter 6)

- Construct, interpret, draw and justify conclusions from scatter plots.
- Describe relationships in data represented in scatter plots (linear, non-linear, positive correlation, negative correlation, no correlation).
- Find and use least square regression line (line-of-best fit) as a model for data that suggest a linear trend for real-world data and use the equation, table, or graph to make predictions and solve real-world problems.
- Calculate the correlation and \( R^2 \) and understand correlation as a measure of the strength of a linear relationship in context.

#### Essential Focus:

Describe graphs including linear, quadratic, absolute value, and exponential functions, using key words such as intercepts, minima, maxima, vertex, symmetry, intervals where the function is increasing, decreasing, positive or negative and determine the domain and range of such functions.

#### Note: MAAP Window

- Fall 2019: November 18-December 13
- Spring 2020: April 13-March 15

**Note:** Some chapters/sections were omitted or out of sequence. Therefore, teachers must preview homework questions to be sure no problems are assigned from an omitted chapter/section.

*This pacing calendar follows the CPM Algebra I Textbook that the district has adopted as a resource to assist in teaching the MS College & Career Readiness Standards (MS CCRS) for Algebra I. The specific lessons addressed in this pacing guide are aligned to the set standards. However, this pacing guide is not meant to be an exhaustive list nor is it a list that limits how the standards are taught in the classroom. This is a sample pacing to help teachers with planning and a guide to understand the knowledge and skills that define the standards.*