

Florida Tutorials are designed specifically for the New Florida Standards for Math and English Language Arts and the Next Generation Sunshine State Standards (NGSSS) for science and social studies to prepare students for the Florida Standards Assessments and the NGSSS End-of-Course (EOC) exams.

Math Tutorials offer targeted instruction, practice and review designed to develop computational fluency, deepen conceptual understanding, and apply mathematical practices. They automatically identify and address learning gaps down to elementary-level content, using adaptive remediation to bring students to grade-level no matter where they start. Students engage with the content in an interactive, feedback-rich environment as they progress through standards-aligned modules. By constantly honing the ability to apply their knowledge in abstract and real world scenarios, students build the depth of knowledge and higher order skills required to demonstrate their mastery when put to the test.

In each module, the Learn It and Try It make complex ideas accessible to students through focused content, modeled logic and process, multi-modal representations, and personalized feedback as students reason through increasingly challenging problems. The Review It offers a high impact summary of key concepts and relates those concepts to students' lives. The Test It assesses students' mastery of the module's concepts, providing granular performance data to students and teachers after each attempt. To help students focus on the content most relevant to them, unit-level pretests and posttests can quickly identify where students are strong and where they're still learning.

1. PROPERTIES OF EXPONENTS

• SIMPLIFYING SQUARE ROOTS

- **MA.912.NSO.1.1** *Extend previous understanding of the Laws of Exponents to include rational exponents. Apply the Laws of Exponents to evaluate numerical expressions and generate equivalent numerical expressions involving rational exponents.*
- **MA.912.NSO.1.4** *Apply previous understanding of operations with rational numbers to add, subtract, multiply and divide numerical radicals.*

• LAWS OF EXPONENTS

- **MA.912.NSO.1.1** *Extend previous understanding of the Laws of Exponents to include rational exponents. Apply the Laws of Exponents to evaluate numerical expressions and generate equivalent numerical expressions involving rational exponents.*
- **MA.912.NSO.1.2** *Generate equivalent algebraic expressions using the properties of exponents.*

2. EQUATIONS AND INEQUALITIES

• ONE-STEP EQUATIONS AND INEQUALITIES

- **MA.912.AR.2.6** *Given a mathematical or real-world context, write and solve one-variable linear inequalities, including compound inequalities. Represent solutions algebraically or graphically.*

• MULTI-STEP EQUATIONS AND INEQUALITIES

- **MA.912.AR.2.6** *Given a mathematical or real-world context, write and solve one-variable linear inequalities, including compound inequalities. Represent solutions algebraically or graphically.*
- **MA.912.AR.2.1** *Given a real-world context, write and solve one-variable multi-step linear equations.*

• AXIOMS OF EQUALITY

- **MA.912.AR.2.1** *Given a real-world context, write and solve one-variable multi-step linear equations.*

• LITERAL EQUATIONS

- **MA.912.AR.1.2** Rearrange equations or formulas to isolate a quantity of interest.

3. WRITING EXPRESSIONS AND EQUATIONS

• FORMULATING AND SIMPLIFYING ALGEBRAIC EXPRESSIONS

- **MA.912.AR.1.1** Identify and interpret parts of an equation or expression that represent a quantity in terms of a mathematical or real-world context, including viewing one or more of its parts as a single entity.
- **MA.912.AR.2.7** Write two-variable linear inequalities to represent relationships between quantities from a graph or a written description within a mathematical or real-world context.
- **MA.912.NSO.1.2** Generate equivalent algebraic expressions using the properties of exponents.

• FORMULATING AND SOLVING EQUATIONS FROM WORD PROBLEMS

- **MA.912.AR.2.5** Solve and graph mathematical and real-world problems that are modeled with linear functions. Interpret key features and determine constraints in terms of the context.
- **MA.912.AR.1.1** Identify and interpret parts of an equation or expression that represent a quantity in terms of a mathematical or real-world context, including viewing one or more of its parts as a single entity.
- **MA.912.AR.2.1** Given a real-world context, write and solve one-variable multi-step linear equations.

• FORMULATING AND SOLVING INEQUALITIES FROM WORD PROBLEMS

- **MA.912.AR.2.6** Given a mathematical or real-world context, write and solve one-variable linear inequalities, including compound inequalities. Represent solutions algebraically or graphically.

4. FUNCTIONS

• FUNCTIONS AND RELATIONS

- **MA.912.AR.2.2** Write a linear two-variable equation to represent relationships between quantities from a graph, a written description or a table of values within a mathematical or real-world context.
- **MA.912.F.1.2** Given a function represented in function notation, evaluate the function for an input in its domain. For a real-world context, interpret the output.
- **MA.912.AR.2.4** Given a table, equation or written description of a linear function, graph that function, and determine and interpret its key features.
- **MA.912.AR.2.5** Solve and graph mathematical and real-world problems that are modeled with linear functions. Interpret key features and determine constraints in terms of the context.

• DOMAIN AND RANGE

- **MA.912.DP.1.2** Interpret data distributions represented in various ways. State whether the data is numerical or categorical, whether it is univariate or bivariate and interpret the different components and quantities in the display.
- **MA.912.AR.2.4** Given a table, equation or written description of a linear function, graph that function, and determine and interpret its key features.
- **MA.912.AR.3.7** Given a table, equation or written description of a quadratic function, graph that function, and determine and interpret its key features.
- **MA.912.AR.3.8** Solve and graph mathematical and real-world problems that are modeled with quadratic functions. Interpret key features and determine constraints in terms of the context.
- **MA.912.F.1.6** Compare key features of linear and nonlinear functions each represented algebraically, graphically, in tables or written descriptions.
- **MA.912.F.1.5** Compare key features of linear functions each represented algebraically, graphically, in tables or written descriptions.
- **MA.912.AR.2.5** Solve and graph mathematical and real-world problems that are modeled with linear functions. Interpret key features and determine constraints in terms of the context.

• EVALUATING FUNCTIONS

- **MA.912.F.1.2** Given a function represented in function notation, evaluate the function for an input in its domain. For a real-world

context, interpret the output.

- **MA.912.AR.2.5** Solve and graph mathematical and real-world problems that are modeled with linear functions. Interpret key features and determine constraints in terms of the context.
- **MA.912.AR.3.7** Given a table, equation or written description of a quadratic function, graph that function, and determine and interpret its key features.
- **MA.912.AR.3.8** Solve and graph mathematical and real-world problems that are modeled with quadratic functions. Interpret key features and determine constraints in terms of the context.

5. GRAPHS OF LINEAR EQUATIONS AND INEQUALITIES

• SLOPE

- **MA.912.AR.2.4** Given a table, equation or written description of a linear function, graph that function, and determine and interpret its key features.
- **MA.912.F.1.3** Calculate and interpret the average rate of change of a real-world situation represented graphically, algebraically or in a table over a specified interval.
- **MA.912.AR.2.5** Solve and graph mathematical and real-world problems that are modeled with linear functions. Interpret key features and determine constraints in terms of the context.
- **MA.912.AR.3.7** Given a table, equation or written description of a quadratic function, graph that function, and determine and interpret its key features.
- **MA.912.AR.2.2** Write a linear two-variable equation to represent relationships between quantities from a graph, a written description or a table of values within a mathematical or real-world context.
- **MA.912.AR.2.3** Write a linear two-variable equation for a line that is parallel or perpendicular to a given line and goes through a given point.
- **MA.912.F.1.5** Compare key features of linear functions each represented algebraically, graphically, in tables or written descriptions.

• GRAPHING AND ANALYZING LINEAR FUNCTIONS

- **MA.912.AR.2.4** Given a table, equation or written description of a linear function, graph that function, and determine and interpret its key features.
- **MA.912.AR.2.5** Solve and graph mathematical and real-world problems that are modeled with linear functions. Interpret key features and determine constraints in terms of the context.
- **MA.912.AR.2.2** Write a linear two-variable equation to represent relationships between quantities from a graph, a written description or a table of values within a mathematical or real-world context.
- **MA.912.F.1.3** Calculate and interpret the average rate of change of a real-world situation represented graphically, algebraically or in a table over a specified interval.
- **MA.912.F.1.2** Given a function represented in function notation, evaluate the function for an input in its domain. For a real-world context, interpret the output.

• GRAPHING AND MANIPULATING $Y = MX + B$

- **MA.912.AR.2.4** Given a table, equation or written description of a linear function, graph that function, and determine and interpret its key features.
- **MA.912.AR.2.5** Solve and graph mathematical and real-world problems that are modeled with linear functions. Interpret key features and determine constraints in terms of the context.
- **MA.912.AR.2.2** Write a linear two-variable equation to represent relationships between quantities from a graph, a written description or a table of values within a mathematical or real-world context.
- **MA.912.F.2.1** Identify the effect on the graph or table of a given function after replacing $f(x)$ by $f(x) + k$, $kf(x)$, $f(kx)$ and $f(x + k)$ for specific values of k .
- **MA.912.F.1.5** Compare key features of linear functions each represented algebraically, graphically, in tables or written descriptions.

• GRAPHS OF LINEAR INEQUALITIES

- **MA.912.AR.2.8** Given a mathematical or real-world context, graph the solution set to a two-variable linear inequality.
- **MA.912.AR.2.7** Write two-variable linear inequalities to represent relationships between quantities from a graph or a written

description within a mathematical or real-world context.

- **MA.912.AR.2.6** Given a mathematical or real-world context, write and solve one-variable linear inequalities, including compound inequalities. Represent solutions algebraically or graphically.

6. LINEAR EQUATIONS

• SLOPE-INTERCEPT FORM OF A LINEAR EQUATION

- **MA.912.F.1.3** Calculate and interpret the average rate of change of a real-world situation represented graphically, algebraically or in a table over a specified interval.
- **MA.912.AR.2.4** Given a table, equation or written description of a linear function, graph that function, and determine and interpret its key features.
- **MA.912.AR.2.5** Solve and graph mathematical and real-world problems that are modeled with linear functions. Interpret key features and determine constraints in terms of the context.
- **MA.912.AR.2.2** Write a linear two-variable equation to represent relationships between quantities from a graph, a written description or a table of values within a mathematical or real-world context.
- **MA.912.AR.1.2** Rearrange equations or formulas to isolate a quantity of interest.
- **MA.912.F.1.5** Compare key features of linear functions each represented algebraically, graphically, in tables or written descriptions.
- **MA.912.AR.2.3** Write a linear two-variable equation for a line that is parallel or perpendicular to a given line and goes through a given point.

• POINT-SLOPE FORM OF A LINEAR EQUATION

- **MA.912.AR.2.5** Solve and graph mathematical and real-world problems that are modeled with linear functions. Interpret key features and determine constraints in terms of the context.
- **MA.912.AR.2.2** Write a linear two-variable equation to represent relationships between quantities from a graph, a written description or a table of values within a mathematical or real-world context.
- **MA.912.AR.1.2** Rearrange equations or formulas to isolate a quantity of interest.
- **MA.912.AR.2.3** Write a linear two-variable equation for a line that is parallel or perpendicular to a given line and goes through a given point.

7. LINEAR SYSTEMS

• SOLVING SYSTEMS OF LINEAR EQUATIONS: GUESS AND CHECK

- **MA.912.AR.9.6** Given a real-world context, represent constraints as systems of linear equations or inequalities. Interpret solutions to problems as viable or nonviable options.
- **MA.912.AR.9.1** Given a mathematical or real-world context, write and solve a system of two-variable linear equations algebraically or graphically.

• SOLVING SYSTEMS OF LINEAR EQUATIONS: GRAPHING

- **MA.912.AR.9.6** Given a real-world context, represent constraints as systems of linear equations or inequalities. Interpret solutions to problems as viable or nonviable options.
- **MA.912.AR.9.1** Given a mathematical or real-world context, write and solve a system of two-variable linear equations algebraically or graphically.

• SOLVING SYSTEMS OF LINEAR EQUATIONS: SUBSTITUTION

- **MA.912.AR.2.2** Write a linear two-variable equation to represent relationships between quantities from a graph, a written description or a table of values within a mathematical or real-world context.
- **MA.912.AR.9.6** Given a real-world context, represent constraints as systems of linear equations or inequalities. Interpret solutions to problems as viable or nonviable options.
- **MA.912.AR.9.1** Given a mathematical or real-world context, write and solve a system of two-variable linear equations algebraically or graphically.
- **MA.912.AR.1.2** Rearrange equations or formulas to isolate a quantity of interest.

- **SOLVING SYSTEMS OF LINEAR EQUATIONS: ELIMINATION**

- **MA.912.AR.2.2** Write a linear two-variable equation to represent relationships between quantities from a graph, a written description or a table of values within a mathematical or real-world context.
- **MA.912.AR.9.6** Given a real-world context, represent constraints as systems of linear equations or inequalities. Interpret solutions to problems as viable or nonviable options.
- **MA.912.AR.9.1** Given a mathematical or real-world context, write and solve a system of two-variable linear equations algebraically or graphically.

- **SOLVING SYSTEMS OF LINEAR INEQUALITIES**

- **MA.912.AR.9.6** Given a real-world context, represent constraints as systems of linear equations or inequalities. Interpret solutions to problems as viable or nonviable options.
- **MA.912.AR.2.7** Write two-variable linear inequalities to represent relationships between quantities from a graph or a written description within a mathematical or real-world context.
- **MA.912.AR.2.8** Given a mathematical or real-world context, graph the solution set to a two-variable linear inequality.
- **MA.912.AR.9.4** Graph the solution set of a system of two-variable linear inequalities.

8. EXPONENTIAL FUNCTIONS AND EQUATIONS

- **EXPONENTIAL FUNCTIONS**

- **MA.912.AR.5.3** Given a mathematical or real-world context, classify an exponential function as representing growth or decay.
- **MA.912.F.1.3** Calculate and interpret the average rate of change of a real-world situation represented graphically, algebraically or in a table over a specified interval.
- **MA.912.AR.1.1** Identify and interpret parts of an equation or expression that represent a quantity in terms of a mathematical or real-world context, including viewing one or more of its parts as a single entity.
- **MA.912.AR.5.6** Given a table, equation or written description of an exponential function, graph that function and determine its key features.
- **MA.912.F.1.6** Compare key features of linear and nonlinear functions each represented algebraically, graphically, in tables or written descriptions.
- **MA.912.F.1.2** Given a function represented in function notation, evaluate the function for an input in its domain. For a real-world context, interpret the output.
- **MA.912.AR.2.4** Given a table, equation or written description of a linear function, graph that function, and determine and interpret its key features.
- **MA.912.AR.5.4** Write an exponential function to represent a relationship between two quantities from a graph, a written description or a table of values within a mathematical or real-world context.
- **MA.912.FL.3.2** Solve real-world problems involving simple, compound and continuously compounded interest.
- **MA.912.FL.3.4** Explain the relationship between simple interest and linear growth. Explain the relationship between compound interest and exponential growth and the relationship between continuously compounded interest and exponential growth.

- **EXPONENTIAL GROWTH AND DECAY**

- **MA.912.F.1.3** Calculate and interpret the average rate of change of a real-world situation represented graphically, algebraically or in a table over a specified interval.
- **MA.912.AR.1.1** Identify and interpret parts of an equation or expression that represent a quantity in terms of a mathematical or real-world context, including viewing one or more of its parts as a single entity.
- **MA.912.AR.5.3** Given a mathematical or real-world context, classify an exponential function as representing growth or decay.
- **MA.912.F.1.6** Compare key features of linear and nonlinear functions each represented algebraically, graphically, in tables or written descriptions.
- **MA.912.AR.5.6** Given a table, equation or written description of an exponential function, graph that function and determine its key features.
- **MA.912.F.1.1** Given an equation or graph that defines a function, classify the function type. Given an input-output table, determine a function type that could represent it.
- **MA.912.F.1.8** Determine whether a linear, quadratic or exponential function best models a given real-world situation.
- **MA.912.FL.3.2** Solve real-world problems involving simple, compound and continuously compounded interest.

- **MA.912.F.1.2** Given a function represented in function notation, evaluate the function for an input in its domain. For a real-world context, interpret the output.
- **MA.912.FL.3.4** Explain the relationship between simple interest and linear growth. Explain the relationship between compound interest and exponential growth and the relationship between continuously compounded interest and exponential growth.
- **MA.912.AR.5.4** Write an exponential function to represent a relationship between two quantities from a graph, a written description or a table of values within a mathematical or real-world context.

9. POLYNOMIALS

• POLYNOMIAL BASICS

- **MA.912.AR.1.1** Identify and interpret parts of an equation or expression that represent a quantity in terms of a mathematical or real-world context, including viewing one or more of its parts as a single entity.

• ADDITION AND SUBTRACTION OF POLYNOMIALS

- **MA.912.AR.1.3** Add, subtract and multiply polynomial expressions with rational number coefficients.

• MULTIPLICATION OF POLYNOMIALS

- **MA.912.AR.1.3** Add, subtract and multiply polynomial expressions with rational number coefficients.

• DIVISION OF POLYNOMIALS

- **MA.912.AR.1.4** Divide a polynomial expression by a monomial expression with rational number coefficients.

10. FACTORING

• FACTORING QUADRATIC TRINOMIALS

- **MA.912.AR.1.7** Rewrite a polynomial expression as a product of polynomials over the real number system.
- **MA.912.AR.1.1** Identify and interpret parts of an equation or expression that represent a quantity in terms of a mathematical or real-world context, including viewing one or more of its parts as a single entity.
- **MA.912.AR.3.6** Given an expression or equation representing a quadratic function, determine the vertex and zeros and interpret them in terms of a real-world context.
- **MA.912.AR.1.3** Add, subtract and multiply polynomial expressions with rational number coefficients.

• FACTORING SPECIAL CASES

- **MA.912.AR.3.7** Given a table, equation or written description of a quadratic function, graph that function, and determine and interpret its key features.
- **MA.912.AR.3.8** Solve and graph mathematical and real-world problems that are modeled with quadratic functions. Interpret key features and determine constraints in terms of the context.
- **MA.912.AR.1.1** Identify and interpret parts of an equation or expression that represent a quantity in terms of a mathematical or real-world context, including viewing one or more of its parts as a single entity.
- **MA.912.AR.1.7** Rewrite a polynomial expression as a product of polynomials over the real number system.
- **MA.912.AR.3.1** Given a mathematical or real-world context, write and solve one-variable quadratic equations over the real number system.
- **MA.912.AR.3.6** Given an expression or equation representing a quadratic function, determine the vertex and zeros and interpret them in terms of a real-world context.

• FACTORING HIGHER-ORDER POLYNOMIALS

- **MA.912.AR.1.1** Identify and interpret parts of an equation or expression that represent a quantity in terms of a mathematical or real-world context, including viewing one or more of its parts as a single entity.
- **MA.912.AR.1.7** Rewrite a polynomial expression as a product of polynomials over the real number system.

11. GRAPHS OF QUADRATIC FUNCTIONS

• QUADRATIC FUNCTIONS

- **MA.912.AR.2.4** Given a table, equation or written description of a linear function, graph that function, and determine and interpret its key features.
- **MA.912.AR.3.7** Given a table, equation or written description of a quadratic function, graph that function, and determine and interpret its key features.
- **MA.912.AR.3.8** Solve and graph mathematical and real-world problems that are modeled with quadratic functions. Interpret key features and determine constraints in terms of the context.
- **MA.912.AR.3.6** Given an expression or equation representing a quadratic function, determine the vertex and zeros and interpret them in terms of a real-world context.
- **MA.912.F.1.1** Given an equation or graph that defines a function, classify the function type. Given an input-output table, determine a function type that could represent it.
- **MA.912.AR.1.1** Identify and interpret parts of an equation or expression that represent a quantity in terms of a mathematical or real-world context, including viewing one or more of its parts as a single entity.
- **MA.912.AR.3.4** Write a quadratic function to represent the relationship between two quantities from a graph, a written description or a table of values within a mathematical or real-world context.
- **MA.912.F.1.6** Compare key features of linear and nonlinear functions each represented algebraically, graphically, in tables or written descriptions.
- **MA.912.AR.3.1** Given a mathematical or real-world context, write and solve one-variable quadratic equations over the real number system.

• ANALYZING GRAPHS OF QUADRATIC FUNCTIONS

- **MA.912.AR.3.7** Given a table, equation or written description of a quadratic function, graph that function, and determine and interpret its key features.
- **MA.912.AR.3.8** Solve and graph mathematical and real-world problems that are modeled with quadratic functions. Interpret key features and determine constraints in terms of the context.
- **MA.912.F.1.1** Given an equation or graph that defines a function, classify the function type. Given an input-output table, determine a function type that could represent it.
- **MA.912.AR.2.4** Given a table, equation or written description of a linear function, graph that function, and determine and interpret its key features.
- **MA.912.F.2.1** Identify the effect on the graph or table of a given function after replacing $f(x)$ by $f(x) + k$, $kf(x)$, $f(kx)$ and $f(x + \quad)$ for specific values of k .
- **MA.912.F.1.6** Compare key features of linear and nonlinear functions each represented algebraically, graphically, in tables or written descriptions.
- **MA.912.AR.3.4** Write a quadratic function to represent the relationship between two quantities from a graph, a written description or a table of values within a mathematical or real-world context.

• REPRESENTATIONS OF QUADRATIC FUNCTIONS

- **MA.912.AR.1.2** Rearrange equations or formulas to isolate a quantity of interest.
- **MA.912.AR.2.4** Given a table, equation or written description of a linear function, graph that function, and determine and interpret its key features.
- **MA.912.AR.3.7** Given a table, equation or written description of a quadratic function, graph that function, and determine and interpret its key features.
- **MA.912.AR.3.4** Write a quadratic function to represent the relationship between two quantities from a graph, a written description or a table of values within a mathematical or real-world context.
- **MA.912.AR.3.8** Solve and graph mathematical and real-world problems that are modeled with quadratic functions. Interpret key features and determine constraints in terms of the context.
- **MA.912.AR.3.5** Given the x -intercepts and another point on the graph of a quadratic function, write the equation for the function.
- **MA.912.AR.3.6** Given an expression or equation representing a quadratic function, determine the vertex and zeros and interpret them in terms of a real-world context.

12. SOLVING QUADRATIC FUNCTIONS

- **SOLVING QUADRATIC FUNCTIONS BY FACTORING**

- **MA.912.AR.3.7** Given a table, equation or written description of a quadratic function, graph that function, and determine and interpret its key features.
- **MA.912.AR.3.8** Solve and graph mathematical and real-world problems that are modeled with quadratic functions. Interpret key features and determine constraints in terms of the context.
- **MA.912.AR.3.1** Given a mathematical or real-world context, write and solve one-variable quadratic equations over the real number system.
- **MA.912.AR.3.6** Given an expression or equation representing a quadratic function, determine the vertex and zeros and interpret them in terms of a real-world context.
- **MA.912.AR.1.7** Rewrite a polynomial expression as a product of polynomials over the real number system.
- **MA.912.AR.2.4** Given a table, equation or written description of a linear function, graph that function, and determine and interpret its key features.
- **MA.912.AR.3.5** Given the x -intercepts and another point on the graph of a quadratic function, write the equation for the function.
- **MA.912.AR.3.4** Write a quadratic function to represent the relationship between two quantities from a graph, a written description or a table of values within a mathematical or real-world context.

- **COMPLETING THE SQUARE**

- **MA.912.AR.3.8** Solve and graph mathematical and real-world problems that are modeled with quadratic functions. Interpret key features and determine constraints in terms of the context.
- **MA.912.AR.3.1** Given a mathematical or real-world context, write and solve one-variable quadratic equations over the real number system.
- **MA.912.AR.1.2** Rearrange equations or formulas to isolate a quantity of interest.
- **MA.912.AR.3.7** Given a table, equation or written description of a quadratic function, graph that function, and determine and interpret its key features.
- **MA.912.F.1.6** Compare key features of linear and nonlinear functions each represented algebraically, graphically, in tables or written descriptions.
- **MA.912.AR.3.6** Given an expression or equation representing a quadratic function, determine the vertex and zeros and interpret them in terms of a real-world context.
- **MA.912.AR.3.4** Write a quadratic function to represent the relationship between two quantities from a graph, a written description or a table of values within a mathematical or real-world context.

- **QUADRATIC FORMULA**

- **MA.912.AR.3.8** Solve and graph mathematical and real-world problems that are modeled with quadratic functions. Interpret key features and determine constraints in terms of the context.
- **MA.912.AR.3.1** Given a mathematical or real-world context, write and solve one-variable quadratic equations over the real number system.
- **MA.912.AR.3.6** Given an expression or equation representing a quadratic function, determine the vertex and zeros and interpret them in terms of a real-world context.
- **MA.912.AR.2.4** Given a table, equation or written description of a linear function, graph that function, and determine and interpret its key features.
- **MA.912.AR.3.7** Given a table, equation or written description of a quadratic function, graph that function, and determine and interpret its key features.
- **MA.912.AR.3.4** Write a quadratic function to represent the relationship between two quantities from a graph, a written description or a table of values within a mathematical or real-world context.

13. PARENT FUNCTIONS AND TRANSFORMATIONS

- **LINEAR AND EXPONENTIAL PARENT FUNCTIONS**

- **MA.912.F.1.3** Calculate and interpret the average rate of change of a real-world situation represented graphically, algebraically or in a table over a specified interval.
- **MA.912.AR.2.5** Solve and graph mathematical and real-world problems that are modeled with linear functions. Interpret key features and determine constraints in terms of the context.
- **MA.912.F.1.1** Given an equation or graph that defines a function, classify the function type. Given an input-output table,

determine a function type that could represent it.

- **MA.912.F.1.6** Compare key features of linear and nonlinear functions each represented algebraically, graphically, in tables or written descriptions.
- **MA.912.AR.2.4** Given a table, equation or written description of a linear function, graph that function, and determine and interpret its key features.
- **MA.912.AR.5.6** Given a table, equation or written description of an exponential function, graph that function and determine its key features.

• QUADRATIC PARENT FUNCTION

- **MA.912.AR.3.7** Given a table, equation or written description of a quadratic function, graph that function, and determine and interpret its key features.
- **MA.912.AR.3.8** Solve and graph mathematical and real-world problems that are modeled with quadratic functions. Interpret key features and determine constraints in terms of the context.
- **MA.912.F.1.1** Given an equation or graph that defines a function, classify the function type. Given an input-output table, determine a function type that could represent it.

• TRANSFORMATIONS OF THE LINEAR AND EXPONENTIAL PARENT FUNCTIONS

- **MA.912.F.2.1** Identify the effect on the graph or table of a given function after replacing $f(x)$ by $f(x) + k$, $kf(x)$, $f(kx)$ and $f(x +)$ for specific values of k .

• TRANSFORMATIONS OF THE QUADRATIC PARENT FUNCTION

- **MA.912.F.2.1** Identify the effect on the graph or table of a given function after replacing $f(x)$ by $f(x) + k$, $kf(x)$, $f(kx)$ and $f(x +)$ for specific values of k .
- **MA.912.AR.3.7** Given a table, equation or written description of a quadratic function, graph that function, and determine and interpret its key features.

14. WORKING WITH FUNCTIONS

• LINEAR VERSUS NONLINEAR FUNCTIONS

- **MA.912.AR.2.4** Given a table, equation or written description of a linear function, graph that function, and determine and interpret its key features.
- **MA.912.AR.5.6** Given a table, equation or written description of an exponential function, graph that function and determine its key features.
- **MA.912.F.1.1** Given an equation or graph that defines a function, classify the function type. Given an input-output table, determine a function type that could represent it.
- **MA.912.F.1.6** Compare key features of linear and nonlinear functions each represented algebraically, graphically, in tables or written descriptions.
- **MA.912.FL.3.2** Solve real-world problems involving simple, compound and continuously compounded interest.
- **MA.912.FL.3.4** Explain the relationship between simple interest and linear growth. Explain the relationship between compound interest and exponential growth and the relationship between continuously compounded interest and exponential growth.
- **MA.912.AR.2.5** Solve and graph mathematical and real-world problems that are modeled with linear functions. Interpret key features and determine constraints in terms of the context.
- **MA.912.F.1.8** Determine whether a linear, quadratic or exponential function best models a given real-world situation.
- **MA.912.F.1.3** Calculate and interpret the average rate of change of a real-world situation represented graphically, algebraically or in a table over a specified interval.

• ABSOLUTE VALUE FUNCTIONS

- **MA.912.AR.4.3** Given a table, equation or written description of an absolute value function, graph that function and determine its key features.
- **MA.912.AR.2.4** Given a table, equation or written description of a linear function, graph that function, and determine and interpret its key features.
- **MA.912.F.2.1** Identify the effect on the graph or table of a given function after replacing $f(x)$ by $f(x) + k$, $kf(x)$, $f(kx)$ and $f(x +$

) for specific values of k .

- **MA.912.F.1.6** Compare key features of linear and nonlinear functions each represented algebraically, graphically, in tables or written descriptions.

• MULTIPLE REPRESENTATIONS OF FUNCTIONS

- **MA.912.AR.2.4** Given a table, equation or written description of a linear function, graph that function, and determine and interpret its key features.
- **MA.912.AR.2.5** Solve and graph mathematical and real-world problems that are modeled with linear functions. Interpret key features and determine constraints in terms of the context.
- **MA.912.AR.1.2** Rearrange equations or formulas to isolate a quantity of interest.
- **MA.912.AR.2.2** Write a linear two-variable equation to represent relationships between quantities from a graph, a written description or a table of values within a mathematical or real-world context.
- **MA.912.F.1.6** Compare key features of linear and nonlinear functions each represented algebraically, graphically, in tables or written descriptions.
- **MA.912.F.1.5** Compare key features of linear functions each represented algebraically, graphically, in tables or written descriptions.
- **MA.912.AR.3.7** Given a table, equation or written description of a quadratic function, graph that function, and determine and interpret its key features.
- **MA.912.AR.3.4** Write a quadratic function to represent the relationship between two quantities from a graph, a written description or a table of values within a mathematical or real-world context.
- **MA.912.AR.3.8** Solve and graph mathematical and real-world problems that are modeled with quadratic functions. Interpret key features and determine constraints in terms of the context.
- **MA.912.AR.3.6** Given an expression or equation representing a quadratic function, determine the vertex and zeros and interpret them in terms of a real-world context.
- **MA.912.AR.5.6** Given a table, equation or written description of an exponential function, graph that function and determine its key features.
- **MA.912.AR.5.4** Write an exponential function to represent a relationship between two quantities from a graph, a written description or a table of values within a mathematical or real-world context.

15. STATISTICS

• DATA ANALYSIS

- **MA.912.AR.2.7** Write two-variable linear inequalities to represent relationships between quantities from a graph or a written description within a mathematical or real-world context.
- **MA.912.DP.1.1** Given a set of data, select an appropriate method to represent the data, depending on whether it is numerical or categorical data and on whether it is univariate or bivariate.
- **MA.912.DP.1.2** Interpret data distributions represented in various ways. State whether the data is numerical or categorical, whether it is univariate or bivariate and interpret the different components and quantities in the display.

• FREQUENCY TABLES

- **MA.912.DP.1.1** Given a set of data, select an appropriate method to represent the data, depending on whether it is numerical or categorical data and on whether it is univariate or bivariate.
- **MA.912.DP.3.1** Construct a two-way frequency table summarizing bivariate categorical data. Interpret joint and marginal frequencies and determine possible associations in terms of a real-world context.
- **MA.912.DP.1.2** Interpret data distributions represented in various ways. State whether the data is numerical or categorical, whether it is univariate or bivariate and interpret the different components and quantities in the display.

• SCATTERPLOTS

- **MA.912.DP.1.2** Interpret data distributions represented in various ways. State whether the data is numerical or categorical, whether it is univariate or bivariate and interpret the different components and quantities in the display.
- **MA.912.DP.1.1** Given a set of data, select an appropriate method to represent the data, depending on whether it is numerical or categorical data and on whether it is univariate or bivariate.
- **MA.912.DP.1.3** Explain the difference between correlation and causation in the contexts of both numerical and categorical data.

- **MA.912.DP.2.4** *Fit a linear function to bivariate numerical data that suggests a linear association and interpret the slope and y-intercept of the model. Use the model to solve real-world problems in terms of the context of the data.*
- **MA.912.DP.2.6** *Given a scatter plot with a line of fit and residuals, determine the strength and direction of the correlation. Interpret strength and direction within a real-world context.*

- **SCATTERPLOTS AND MODELING**

- **MA.912.DP.2.4** *Fit a linear function to bivariate numerical data that suggests a linear association and interpret the slope and y-intercept of the model. Use the model to solve real-world problems in terms of the context of the data.*
- **MA.912.DP.1.2** *Interpret data distributions represented in various ways. State whether the data is numerical or categorical, whether it is univariate or bivariate and interpret the different components and quantities in the display.*
- **MA.912.DP.2.6** *Given a scatter plot with a line of fit and residuals, determine the strength and direction of the correlation. Interpret strength and direction within a real-world context.*
- **MA.912.DP.1.3** *Explain the difference between correlation and causation in the contexts of both numerical and categorical data.*
- **MA.912.F.1.8** *Determine whether a linear, quadratic or exponential function best models a given real-world situation.*
- **MA.912.AR.5.3** *Given a mathematical or real-world context, classify an exponential function as representing growth or decay.*