Florida Mathematics (B.E.S.T.)

Grades 9-12: Access Points

Algebraic Reasoning

Interpret and rewrite algebraic expressions and equations in equivalent forms.

1 Identify a part(s) of an equation or expression and explain the meaning within the context of a problem. MA.912.AR.1.AP.1

2 Rearrange an equation or a formula for a specific variable. MA.912.AR.1.AP.2

3 Add, subtract and multiply polynomial expressions with integer coefficients. MA.912.AR.1.AP.3

4 Divide a polynomial expression by a monomial expression with integer coefficients. MA.912.AR.1.AP.4

5 Divide polynomial expressions using long division, synthetic division and algebraic manipulation where the denominator is a linear expression. MA.912.AR.1.AP.5

6 Solve mathematical and/or real-world problems involving addition, subtraction, multiplication or division of polynomials with integer coefficients. MA.912.AR.1.AP.6

7 Factor a quadratic expression. MA.912.AR.1.AP.7

8 Select a polynomial expression as a product of polynomials with integer coefficients over the real or complex number system. MA.912.AR.1.AP.8

9 Apply previous understanding of rational number operations with common denominators to add and subtract rational expressions. MA.912.AR.1.AP.9

Write, solve and graph linear equations, functions and inequalities in one and two variables.

1. Given an equation in a real-world context, solve one-variable multi-step linear equations. MA.912.AR.2.AP.1
2. Select 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.AP.2
3. Select a linear two-variable equation in slope intercept form for a line that is parallel or perpendicular to a given line and goes through a given point. MA.912.AR.2.AP.3
4. Given a table, equation or written description of a linear function, select a graph of that function and determine at least two key features (can include domain, range, y-intercept or slope). MA.912.AR.2.AP.4
5. Given a mathematical and/or real-world problem that is modeled with linear functions, solve the mathematical problem, or select the graph using key features (in terms of context) that represents this model. MA.912.AR.2.AP.5
6. Given a mathematical and/or real-world context, select a one-variable linear inequality that represents the solution algebraically or graphically. MA.912.AR.2.AP.6
7. Select a two-variable linear inequality to represent relationships between quantities from a graph. MA.912.AR.2.AP.7
8. Given a two-variable linear inequality, select a graph that represents the solution. MA.912.AR.2.AP.8

Write, solve and graph quadratic equations, functions and inequalities in one and two variables.

1 Given a one-variable quadratic equation from a mathematical or real-world context, select the solution to the equation over the real number system. MA.912.AR.3.AP.1

2 Solve mathematical one-variable quadratic equations with integer coefficients over the real and complex number systems. MA.912.AR.3.AP.2

3 Given a mathematical or real-world context, select a one-variable quadratic inequality over the real number system that represents the solution algebraically or graphically. MA.912.AR.3.AP.3

4 Select a quadratic function to represent the relationship between two quantities from a graph. MA.912.AR.3.AP.4

5 Given the x-intercepts and another point on the graph of a quadratic function, select the equation for the function. MA.912.AR.3.AP.5

6 Given an expression or equation representing a quadratic function in vertex form, determine the vertex and zeros. MA.912.AR.3.AP.6

7 Given a table, equation or written description of a quadratic function, select the graph that represents the function. MA.912.AR.3.AP.7

8 Given a mathematical and/or real-world problem that is modeled with quadratic functions, solve the mathematical problem, or select the graph using key features (in terms of context) that represents this model. MA.912.AR.3.AP.8

9 Select two-variable quadratic inequalities to represent relationships between quantities from a graph or a written description. MA.912.AR.3.AP.9

10 Select the graph of the solution set to a two-variable quadratic inequality. MA.912.AR.3.AP.10

Write, solve and graph absolute value equations, functions and inequalities in one and two variables.

1 Solve a one variable absolute value equation. MA.912.AR.4.AP.1

2 Solve a one-variable absolute value inequality. Represent solutions algebraically or graphically. MA.912.AR.4.AP.2

3 Given a table, equation or written description of an absolute value function, select the graph that represents the function. MA.912.AR.4.AP.3

4 Given a mathematical and/or real-world problem that is modeled with absolute value functions, solve the mathematical problem, or select the graph using key features (in terms of context) that represents this model. MA.912.AR.4.AP.4

Write, solve and graph exponential and logarithmic equations and functions in one and two variables.

2 Solve one-variable equations involving logarithms or exponential expressions. Identify any extraneous solutions. MA.912.AR.5.AP.2

3 Given a real-world context, identify an exponential function as representing growth or decay. MA.912.AR.5.AP.3

4 Select an exponential function to represent two quantities from a graph or a table of values. MA.912.AR.5.AP.4

5 Given an expression or equation representing an exponential function, reveal the constant percent rate of change per unit interval using the properties of exponents. MA.912.AR.5.AP.5

6 Given a table, equation or written description of an exponential function, select the graph that represents the function. MA.912.AR.5.AP.6

7 Given a mathematical and/or real-world problem that is modeled with exponential functions, solve the mathematical problem, or select the graph using key features (in terms of context) that represents this model. MA.912.AR.5.AP.7

8 Given an equation of a logarithmic function, select the graph of that function. MA.912.AR.5.AP.8

9 Given a mathematical and/or real-world problem that is modeled with logarithmic functions, solve the mathematical problem, or select the graph using key features (in terms of context) that represents this model. MA.912.AR.5.AP.9

Solve and graph polynomial equations and functions in one and two variables.

1 Solve one-variable polynomial equations of degree 3 or higher in factored form, over the real number system. MA.912.AR.6.AP.1

5 Create a rough graph of a polynomial function of degree 3 or higher (in factored form) using zeros, multiplicity and knowledge of end behavior. MA.912.AR.6.AP.5

Solve and graph radical equations and functions in one and two variables.

1 Solve one-variable radical equations and identify any extraneous solutions. MA.912.AR.7.AP.1

2 Given a table, equation or written description of a square root or cube root function, select the graph that represents the function. MA.912.AR.7.AP.2

3 Given a mathematical and/or real-world problem that is modeled with square root or cube root functions, solve the mathematical problem, or select the graph using key features (in terms of context) that represents this model. MA.912.AR.7.AP.3

Solve and graph rational equations and functions in one and two variables.

1 Solve one-variable rational equations and identify any extraneous solutions. MA.912.AR.8.AP.1

2 Given a table, equation or written description of a rational function, select the graph that represents the function. MA.912.AR.8.AP.2

3 Given a mathematical and/or real-world problem that is modeled with rational functions, solve the mathematical problem, or select the graph using key features (in terms of context) that represents this model. MA.912.AR.8.AP.3

Write and solve a system of two- and three-variable equations and inequalities that describe quantities or relationships.

1 Given an algebraic or graphical system of two-variable linear equations, select the solution to the system of equations. MA.912.AR.9.AP.1

2 Solve a system consisting of a two-variable linear equation and a quadratic equation algebraically or graphically. MA.912.AR.9.AP.2

3 Solve a system consisting of two-variable linear or quadratic equations algebraically or graphically. MA.912.AR.9.AP.3

4 Select the graph of the solution set of a system of two-variable linear inequalities. MA.912.AR.9.AP.4

5 Select the graph of the solution set of a system of two-variable inequalities. MA.912.AR.9.AP.5

6 Given a real-world context, as systems of linear equations or inequalities with identified constraints, select a solution as a viable or non-viable option. MA.912.AR.9.AP.6

7 Given a real-world context, as systems of linear and non-linear equations or inequalities with identified constraints, select a solution as a viable or non-viable option. MA.912.AR.9.AP.7

Data Analysis and Probability

Summarize, represent and interpret categorical and numerical data with one and two variables.

1a Given a set of data, select an appropriate table or graph to represent categorical data and whether it is univariate or bivariate. MA.912.DP.1.AP.1A

1b Given a set of data, select an appropriate table or graph to represent numerical data and whether it is univariate or bivariate. MA.912.DP.1.AP.1B

2 Given a univariate or bivariate data distribution (numerical or categorical), identify the different components and quantities in the display. MA.912.DP.1.AP.2

3 Identify whether the data are explained by correlation or causation in the contexts of both numerical and categorical data. MA.912.DP.1.AP.3

4 Given the mean or percentage and the margin of error from a sample survey, identify a population total. MA.912.DP.1.AP.4

Solve problems involving univariate and bivariate numerical data.

1 For two sets of numerical univariate data, calculate and compare the mean, median and range, then select the shape of the data from given graphs. MA.912.DP.2.AP.1

4 Fit a linear function to bivariate numerical data that suggest a linear association and interpret the slope and y-intercept of the model. MA.912.DP.2.AP.4

5 Match a scatter plot that represents bivariate numerical data with its residual plot. MA.912.DP.2.AP.5

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.2.AP.6

8 Given a scatter plot, select a quadratic function that fits the data the best. MA.912.DP.2.AP.8

9 Given a scatter plot, select an exponential function that fits the data the best. MA.912.DP.2.AP.9

Solve problems involving categorical data.

1 When given a two-way frequency table summarizing bivariate categorical data, identify joint and marginal frequencies. MA.912.DP.3.AP.1

2 Given the marginal relative frequencies and a partially completed two-way table, calculate one missing value per row and/or per column. MA.912.DP.3.AP.2

3 Given a segmented bar graph summarizing categorical bivariate data, select the interpretation in terms of a real-world context. MA.912.DP.3.AP.3

Use and interpret independence and probability.

1 Given a sample space, select a subset of the sample space or given two sets, select the union, intersection, or complement of two sets. MA.912.DP.4.AP.1

2 Given the probability of events A and B and the product of their probabilities, select whether the events are independent or not independent. MA.912.DP.4.AP.2

3 Given the probability of two events, P(A and B) and P(A), in decimal form, select the conditional probability of the two events {[P(A and B))/(P(A)]}. MA.912.DP.4.AP.3

6 Recognize the concept of independence in everyday situations. MA.912.DP.4.AP.6

7 Given the probability of two mutually exclusive events in decimal form, use the addition rule for mutually exclusive probabilities: P(A or B)=P(A)+P(B). MA.912.DP.4.AP.7

8 Given the probability of two independent events in decimal form, use the multiplication rule for independent probabilities: P(A and B)=P(A)P(B). MA.912.DP.4.AP.8

Determine methods of data collection and make inferences from collected data.

11 Given a graph representing data, select whether the graph is misleading or not (i.e., scale on x and y axis not consistent, circle graph does not add up to 100%; missing title or title doesn't represent data; or bar widths on bar graph are inconsistent). MA.912.DP.5.AP.11

Financial Literacy

Build mathematical foundations for financial literacy.

1 Solve real-world problems involving money using percentages and decimals. MA.912.FL.1.AP.1

2 Solve simple real-world problems involving money using ratios or proportions. MA.912.FL.1.AP.2

Develop an understanding of basic accounting and economic principles.

2 Calculate the profit when given the expenses and revenue from a real-world problem. MA.912.FL.2.AP.2

3 Given the consumer price index (CPI), stock indices, or unemployment rates for two different time periods, identify whether the rates are increasing or decreasing. MA.912.FL.2.AP.3

4 Given current exchange rates, convert between currencies. MA.912.FL.2.AP.4

5 Given typical monthly expenses (housing, utilities, food, etc.), determine the monthly income needed. MA.912.FL.2.AP.5

6 Given a paycheck, identify the taxes taken out. MA.912.FL.2.AP.6

Describe the advantages and disadvantages of short-term and long-term purchases.

1 Compare simple and compound interest over time. MA.912.FL.3.AP.1

2 Solve real-world problems involving simple and compound interest. MA.912.FL.3.AP.2

4 Identify the relationship between simple interest and linear growth. Identify the relationship between compound interest and exponential growth. MA.912.FL.3.AP.4

5 Select the advantages and disadvantages of using cash versus credit. MA.912.FL.3.AP.5

6 Given a bill statement, identify the finance charge, interest rate and total amount due. MA.912.FL.3.AP.6

7 Given two different student loan options, compare the advantages and disadvantages of each loan's interest rate, monthly payment and total cost. MA.912.FL.3.AP.7

8 Given the total cost of an item purchased using two different payment plans, calculate the total cost difference of the item between payment plans. MA.912.FL.3.AP.8

9 Given two different mortgage loans, one 15-year and one 30-year, compare the advantages and disadvantages of each loan's interest rate, monthly payment and total cost. MA.912.FL.3.AP.9

10 Identify how short-term and long-term purchases, past payment history, and amount of debt may increase or decrease credit scores. MA.912.FL.3.AP.10

11 Given several payment plans, with the monthly payment calculated, select the plan that will reduce the debt the quickest. MA.912.FL.3.AP.11

Describe the advantages and disadvantages of financial and investment plans, including insurances.

1 Compare various options, deductibles and fees for various types of individual insurance policies, such as medical, car and/or homeowners' insurance. MA.912.FL.4.AP.1

2 Compare the risk of utilizing or not utilizing a one-time warranty. MA.912.FL.4.AP.2

3 List the advantages and disadvantages of having a retirement savings plan. MA.912.FL.4.AP.3

4 Select a retirement savings plan to meet a given personal financial goal. MA.912.FL.4.AP.4

5 List an advantage of diversifying investments. MA.912.FL.4.AP.5

6 Simulate the buying and selling of a single stock and identify its worth over time. MA.912.FL.4.AP.6

Functions

Understand, compare and analyze properties of functions.

1a Given an equation or graph that defines a function, identify the function type as either linear, quadratic, or exponential. MA.912.F.1.AP.1A

1b Given an input-output table with an accompanying graph, determine a function type, either linear, quadratic, or exponential that could represent it. MA.912.F.1.AP.1B

2 Given a function represented in function notation, evaluate the function for an input in its domain. MA.912.F.1.AP.2

3 Given a real-world situation represented graphically or algebraically, identify the rate of change as positive, negative, zero or undefined. MA.912.F.1.AP.3

5 Identify key features of linear and quadratic functions each represented in the same way algebraically or graphically (key features are limited to domain; range; intercepts; intervals where the function is increasing, decreasing, positive or negative; end behavior). MA.912.F.1.AP.5

6 Identify key features of linear, quadratic or exponential functions each represented in a different way algebraically or graphically (key features are limited to domain; range; intercepts; intervals where the function is increasing, decreasing, positive or negative; end behavior). MA.912.F.1.AP.6

7 Compare key features of two functions each represented algebraically or graphically. MA.912.F.1.AP.7

8 Select whether a linear or quadratic function best models a given real-world situation. MA.912.F.1.AP.8

9 Select whether a function is even, odd or neither when represented algebraically. MA.912.F.1.AP.9

Identify and describe the effects of transformations on functions. Create new functions given transformations.

1 Select the effect (up, down, left, or right) on the graph of a given function after replacing f(x) by f(x) + k and f(x + k) for specific values of k. MA.912.F.2.AP.1

2 Identify the effect on the graph of a given function of two or more transformations defined by adding a real number to the x- or y-values. MA.912.F.2.AP.2

3 Given the graph of a given function after replacing f(x) by f(x) + k and f(x + k), kf(c), for specific values of k select the type of transformation and find the value of the real number k. MA.912.F.2.AP.3

5 Given a table, equation or graph that represents a function, select a corresponding table, equation or graph of the transformed function defined by adding a real number to the x- or y-values. MA.912.F.2.AP.5

Create new functions from existing functions.

2 Given a mathematical and/or real-world context, combine two or more functions, limited to linear, quadratic, and polynomial, using arithmetic operations of addition, subtraction, or multiplication. MA.912.F.3.AP.2

4 Given a composite function within a mathematical or real-world context, identify the domain and range of the composite function. MA.912.F.3.AP.4

6 Determine whether an inverse function exists by analyzing graphs and equations. MA.912.F.3.AP.6

7 Represent the inverse of a function algebraically. Use composition of functions to verify that one function is the inverse of the other. MA.912.F.3.AP.7

Geometric Reasoning

Prove and apply geometric theorems to solve problems.

1 Use the relationships and theorems about lines and angles to solve mathematical or real-world problems involving postulates, relationships and theorems of lines and angles. MA.912.GR.1.AP.1

2 Identify the triangle congruence or similarity criteria; Side-Side-Side, Side-Angle-Side, Angle-Side-Angle, Angle-Angle-Side, Angle-Angle and Hypotenuse-Leg. MA.912.GR.1.AP.2

3 Use the relationships and theorems about triangles. Solve mathematical and/or real-world problems involving postulates, relationships and theorems of triangles. MA.912.GR.1.AP.3

4 Use the relationships and theorems about parallelograms. Solve mathematical and/or real-world problems involving postulates, relationships and theorems of parallelograms. MA.912.GR.1.AP.4

5 Use the relationships and theorems about trapezoids. Solve mathematical and/or real-world problems involving postulates, relationships and theorems of trapezoids. MA.912.GR.1.AP.5

6 Use the definitions of congruent or similar figures to solve mathematical and/or real-world problems involving two-dimensional figures. MA.912.GR.1.AP.6

Apply properties of transformations to describe congruence or similarity.

1a Given a preimage and image, identify the transformation. MA.912.GR.2.AP.1A

1b Select the algebraic coordinates that represent the transformation. MA.912.GR.2.AP.1B

2 Select a transformation that preserves distance. MA.912.GR.2.AP.2

3 Identify a given sequence of transformations, that includes translations or reflections, that will map a given figure onto itself or onto another congruent figure. MA.912.GR.2.AP.3

5 Given a geometric figure and a sequence of transformations, select the transformed figure on a coordinate plane. MA.912.GR.2.AP.5

6 Use rigid transformations that includes translations or reflections to map one figure onto another to show that the two figures are congruent. MA.912.GR.2.AP.6

8 Identify an appropriate transformation to map one figure onto another to show that the two figures are similar. MA.912.GR.2.AP.8

Use coordinate geometry to solve problems or prove relationships.

1 Select the weighted average of two or more points on a line. MA.912.GR.3.AP.1

2 Use coordinate geometry to classify definitions, properties and theorems involving circles, triangles, or quadrilaterals. MA.912.GR.3.AP.2

3 Use coordinate geometry to solve mathematical geometric problems involving lines, triangles and quadrilaterals. MA.912.GR.3.AP.3

4 Solve mathematical and/or real-world problems on the coordinate plane involving perimeter or area of a three- or four-sided polygon. MA.912.GR.3.AP.4

Use geometric measurement and dimensions to solve problems.

1 Identify the shape of a two-dimensional cross section of a three-dimensional figure. MA.912.GR.4.AP.1

2 Identify a three-dimensional object generated by the rotation of a two-dimensional figure. MA.912.GR.4.AP.2

3 Select the effect of a dilation on the area of two-dimensional figures and/or surface area or volume of three-dimensional figures. MA.912.GR.4.AP.3

4 Solve mathematical and/or real-world problems involving the area of triangles, squares, circles or rectangles. MA.912.GR.4.AP.4

5 Solve mathematical or real-world problems involving the volume of three-dimensional figures limited to cylinders, pyramids, prisms, or cones. MA.912.GR.4.AP.5

6 Solve mathematical or real-world problems involving the surface area of three-dimensional figures limited to cylinders, pyramids, prisms, and cones. MA.912.GR.4.AP.6

Make formal geometric constructions with a variety of tools and methods.

1 Construct a copy of a segment. MA.912.GR.5.AP.1

2 Construct the bisector of a segment, including the perpendicular bisector of a line segment. MA.912.GR.5.AP.2

3 Select the inscribed and circumscribed circles of a triangle. MA.912.GR.5.AP.3

Use properties and theorems related to circles.

1 Identify and describe the relationship involving the length of a secant, tangent, segment or chord in a given circle. MA.912.GR.6.AP.1

2 Identify the relationship involving the measures of arcs and related angles, limited to central, inscribed and intersections MA.912.GR.6.AP.2

3 Identify and describe the relationship involving triangles and quadrilaterals inscribed in a circle. MA.912.GR.6.AP.3

4 Identify and describe the relationship involving the arc length and area of a sector in a given circle. MA.912.GR.6.AP.4

Apply geometric and algebraic representations of conic sections.

2 Create the equation of a circle when given the center and radius. MA.912.GR.7.AP.2

3 Given an equation of a circle, identify center and radius, and graph the circle. MA.912.GR.7.AP.3

Logic and Discrete Theory

Develop an understanding of the fundamentals of propositional logic, arguments and methods of proof.

3 Identify and accurately interpret “if…then,” “if and only if,” “all” and “not” statements. MA.912.LT.4.AP.3

10 Select the validity of an argument or give counterexamples to disprove statements. MA.912.LT.4.AP.10

Number Sense and Operations

Generate equivalent expressions and perform operations with expressions involving exponents, radicals or logarithms.

1. Evaluate numerical expressions involving rational exponents. MA.912.NSO.1.AP.1
2. Identify equivalent algebraic expressions using properties of exponents. MA.912.NSO.1.AP.2
3. Using properties of exponents, identify equivalent algebraic expressions involving radicals and rational exponents. Radicands are limited to monomial algebraic expression. MA.912.NSO.1.AP.3
4. Apply previous understanding of operations with rational numbers to add and subtract numerical radicals that are in radical form. MA.912.NSO.1.AP.4
5. Add and subtract algebraic expressions involving radicals. Radicands are limited to monomial algebraic expressions. MA.912.NSO.1.AP.5
6. Given a numerical logarithmic expression, identify an equivalent numerical expression using the properties of logarithms or exponents. MA.912.NSO.1.AP.6
7. Given an algebraic logarithmic expression, identify an equivalent algebraic expression using the properties of logarithms or exponents. MA.912.NSO.1.AP.7

Represent and perform operations with expressions within the complex number system.

1. Extend previous understanding of the real number system to include the complex number system. Add and subtract complex numbers. MA.912.NSO.2.AP.1
2. Represent addition and subtraction of complex numbers geometrically on the complex plane. MA.912.NSO.2.AP.2

Trigonometry

Define and use trigonometric ratios, identities or functions to solve problems.

1. Select a trigonometric ratio for acute angles in right triangles limited to sine or cosine. MA.912.T.1.AP.1
2. Given a mathematical and/or real-world problem involving right triangles, solve using trigonometric ratio or the Pythagorean Theorem. MA.912.T.1.AP.2