

Focus Statement: Students will solve multi-step linear, quadratic, and compound equations and inequalities using the algebraic properties of the real number system. They will also graph linear and quadratic equations and inequalities in addition to graphing exponential and special functions.

MA.8.1 Students will apply properties of the real number system to simplify algebraic expressions and solve linear equations.

MA.8.1.1 Apply order of operations to evaluate expressions

MA.8.1.2 Translate verbal phrases into expressions, equations, and inequalities

MA.8.1.3 Solve one-step and two-step linear equations using inverse operations

MA.8.1.4 Solve multi-step linear equations by combining like terms and using the distributive property

MA.8.1.5 Use a problem solving plan and common formulas to solve problems

MA.8.1.6 Solve linear equations with variables on both sides

MA.8.1.7 Write ratios and solve proportions by eliminating denominators and by using cross products.

MA.8.1.8 Solve percent problems using proportions and equations and calculate percent of change

MA.8.1.9 Solve literal equations for a given variable

MA.8.2 Students will graph linear equations in various forms and explain the meaning of slope and y-intercepts in real-life applications.

MA.8.2.1 Represent functions as rules, tables, and graphs, and identify the domain and range of the function

MA.8.2.2 Identify discrete and continuous functions

MA.8.2.3 Evaluate functions using function notation

MA.8.2.4 Apply the definition of a “Well-defined operation” to explain why division by zero is undefined

MA.8.2.5 Graph a line of the form $y = c$ and $x = c$

MA.8.2.6 Graph linear equations using intercepts and interpret the meaning of the intercepts in real-life applications

MA.8.2.7 Calculate slope and define it as the rate in change of the dependent variable to the independent variable including horizontal and vertical lines

MA.8.2.8 Graph a linear function of the form $y = mx + b$ by using the slope and y-intercept of the line without a graphing calculator including horizontal and vertical lines

MA.8.2.9 Write, graph, and define direct variation equations

MA.8.2.10 Use function notation to perform transformations on linear functions

MA.8.2.11 Graph a linear function of the form $y = mx + b$ using a graphing calculator

MA.8.3 Students will write linear equations in various forms.

MA.8.3.1 Write linear equations in slope-intercept form given its slope and y-intercept

MA.8.3.2 Write linear equations in slope-intercept form given a point and slope or two points on the line

MA.8.3.3 Write linear equations in point-slope form

MA.8.3.4 Relate arithmetic sequences to linear functions

MA.8.3.5 Write linear equations in standard form

MA.8.3.6 Write the equations of parallel and perpendicular lines

MA.8.4 Students will solve systems of linear equations.

MA.8.4.1 Apply the Graphing Method with/without a graphing calculator to solve a system of linear equations.

MA.8.4.2 Apply the Substitution Method without a calculator to solve a system of linear equations

MA.8.4.3 Apply the Adding or Subtracting Method without a calculator to solve a system of linear equations

MA.8.4.4 Identify in real-life context, consistent independent, consistent dependent and inconsistent linear systems

MA.8.5 Students will solve and graph linear inequalities in one and two variables including compound and absolute value inequalities.

MA.8.5.1 Solve inequalities using addition, subtraction, multiplication, and division and graph the solution

MA.8.5.2 Solve multi-step inequalities and graph the solution

MA.8.5.3 Identify the difference between an “and” and “or” statement

MA.8.5.4 Solve and graph compound inequalities

MA.8.5.5 Graph linear inequalities in two variables

MA.8.5.6 Solve systems of linear inequalities

MA.8.5.7 Graph $|a|$ on number line and $f(x) = |x|$ on coordinate plane

MA.8.5.8 Solve absolute value equations

MA.8.5.9 Solve and graph absolute value inequalities

MA.8.6 Students will write, graph, and interpret exponential functions.

MA.8.6.1 Write and graph exponential growth functions

MA.8.6.2 Write and graph exponential decay functions

MA.8.7 Students will apply power properties to simplify expressions and classify, perform operations on, and factor polynomials.

MA.8.7.1 Apply the Product of Powers Property to simplify an algebraic expression with positive exponents

MA.8.7.2 Apply the Power of Powers Property to simplify an algebraic expression with positive exponents

MA.8.7.3 Apply the Quotient of Powers Property to simplify an algebraic expression with positive exponents

MA.8.7.4 Apply the power properties to simplify an algebraic expression with negative exponents

MA.8.7.5 Define a polynomial in standard form and classify polynomials by number of terms and degree of terms

MA.8.7.6 Add and subtract polynomials

MA.8.7.7 Multiply polynomials by polynomials using the Distributive Property.

MA.8.7.8 Factor polynomials with a greatest common monomial factor only

MA.8.7.9 Solve polynomial equations in factored form using the zero-product property

MA.8.7.10 Factor trinomials using reverse FOIL

MA.8.7.11 Factor using special product patterns

MA.8.8 Students will graph and describe quadratic equations with and without a graphing calculator.

MA.8.8.1 Identify the characteristics of vertex, maximum or minimum, and axis of symmetry of a parabolic shaped graph and graph $y = ax^2 + c$ without a calculator

MA.8.8.2 Graph a quadratic equation of the form $y = ax^2 + bx + c$ without a calculator

MA.8.8.3 Write and graph quadratic functions in intercept form

MA.8.8.4 Solve quadratic equations by graphing

MA.8.8.5 Use a graphing calculator to graph quadratic equations, find minimum and maximum values, and locate zeros

MA.8.8.6 Use square roots to solve quadratic equations

MA.8.9 Students will solve quadratic equations using various methods.

MA.8.9.1 Solve a quadratic equation using Completing the Square Method

MA.8.9.2 Write and graph quadratic functions in vertex form

MA.8.9.3 Apply the Quadratic Formula to solve a quadratic equation

MA.8.9.4 Use the discriminant to determine the number of solutions for a quadratic equation

MA.8.9.5 Compare linear, exponential, and quadratic models

MA.8.10 Students will create scatter plots and perform regressions.

MA.8.10.1 Create scatter plots and write linear equations to model the data

MA.8.10.2 Perform linear, quadratic, and exponential regression on a set of data using a graphing calculator

MA.8.10.3 Use lines of best fit to make predictions about data

MA.8.11 Students will calculate measures of central tendency.

MA.8.11.1 Calculate mean, median, mode, range and mean absolute deviation for a given data set

MA.8.11.2 Create and interpret stem-and-leaf plots and histograms with and without a graphing calculator

MA.8.11.3 Create and interpret Box-and-Whisker plots with and without a graphing calculator.

MA.8.12 Students will graph, interpret, and compare special functions.

MA.8.12.1 Graph and interpret absolute value functions

MA.8.12.2 Graph and interpret piecewise functions

MA.8.12.3 Graph and interpret step functions

MA.8.12.4 Perform transformations on functions

MA.8.12.5 Compare properties of the above functions