Mathematics | Algebra I

Teachers use these…

Teaching Practices (NCTM, *Principles in Action*, Effective Mathematics Teaching Practices)

- Establish mathematics goals to focus learning
- Implement tasks that promote reasoning and problem solving
- Use and connect mathematical representations
- Facilitate meaningful mathematical discourse
- Pose purposeful questions
- Build procedural fluency from conceptual understanding
- Support productive struggle in learning mathematics
- Elicit and use evidence of student thinking (Formative)

So students can use these…

Student Practices (KCCRS, *Standards for Mathematical Practices*)

- Make sense of problems and persevere in solving them
- Reason abstractly and quantitatively
- Construct viable arguments and critique the reasoning of others
- Model with mathematics
- Use appropriate tools strategically
- Attend to precision
- Look for and make use of structure
- Look for and express regularity in repeated reasoning

ORGANIZING THEME/TOPIC	FOCUS CLUSTERS AND STANDARDS
THESE STANDARDS ARE WOVEN THROUGHOUT ALL UNITS. Working with quantities and the relationships between them provides grounding for work with expressions, equations and functions. Course study is to be limited to only linear, quadratic, and exponential expressions with integer exponents. **Use technology throughout as a way to extend concepts to the next level.** UNITS P - 3 are first semester. UNITS 4 and 5 are second semester.	**N-Q Reason quantitatively and use units to solve problems** • **N-Q.1*** Use units as a way to understand problems and to guide the solutions of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays. • **N-Q.2*** Define appropriate quantities for the purpose of descriptive modeling. • **N-Q.3*** Choose a level of accuracy appropriate to limitations on measurement when reporting quantities**.** **A-SSE Interpret expressions that represent a quantity in terms of its context** • **A-SSE.1a*** Interpret expressions that represent a quantity in terms of its context: Interpret parts of an expression, such as terms, factors, and coefficients. *****It is assumed inherent that students will be MODELING real world application problems using the mathematical practices. MODELING is to be viewed from a ***graphical, numeric (tables)*** and ***algebraic (equations)*** perspective.

ORGANIZING THEME/TOPIC	FOCUS CLUSTERS AND STANDARDS
UNIT P: Pre-requisites for Algebra	
Volume of Cones, Cylinders, and Spheres	**8.G.C.9** Know the formula for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.
Square and Cube Root of a Number, Pythagorean Theorem, and Irrational Numbers • Know that there are numbers that are not rational, and approximate them by rational numbers. • Work with radicals and integer exponents. • Understand and apply the Pythagorean Theorem. • Understand congruence and similarity using physical models, transparencies, or geometry software.	**8.NS.A 1-2** **1)** Understand informally that every number has a decimal expansion; the rational numbers are those with decimal expansions that terminate in 0s or eventually repeat. Know that other numbers are called irrational. **2)** Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line diagram, and estimate the value of expressions (e.g., π^2). For example, by truncating the decimal expansion of $\sqrt{2}$, show that $\sqrt{2}$ is between 1 and 2, then between 1.4 and 1.5, and explain how to continue on to get better approximations. **8.EE.A.2** Use square root and cube root symbols to represent solutions to equations of the form $x2 = p$ and $x3 = p$, where p is a positive rational number. Evaluate square roots of small perfect squares and cube roots of small perfect cubes. Know that $\sqrt{2}$ is irrational. **8.G.B 6-8** **6)** Explain a proof of the Pythagorean Theorem and its converse. **7)** Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions. **8)** Apply the Pythagorean Theorem to find the distance between two points in a coordinate system. **8.G.A.4** Understand that a two-dimensional figure is similar to another if the second can be obtained from the first by a sequence of rotations, reflections, translations, and dilations; given two similar two dimensional figures, describe a sequence that exhibits the similarity between them.

ORGANIZING THEME/TOPIC	FOCUS CLUSTERS AND STANDARDS
UNIT 1: Reasoning with Equations and Inequalities	**A-CED Create equations that describe numbers or relationships.** • **A-CED.1*** Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear models. **(8.EE.C.7)** • **A-CED.3*** Represent constraints by equations or inequalities and interpret solutions as viable or non-viable options in a modeling context. **(8.EE.C.7)** • **A-CED.4*** Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. For example, rearrange Ohm's law V=IR to highlight resistance R. **(8.EE.C.7)**
Limit A.CED.4 to formulas which are linear in the variable of interest (Literal Equations).	
Focus on *inverse* operations, justifying steps and checking solutions. Equations solved should include proportions.	**A-REI Understand solving equations as a process of reasoning and explain the reasoning.** • **A-REI.1** Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.
When graphing inequalities on a number line, use open/closed circles and inequality notation.	**A-REI Solve equations and inequalities in one variable** • **A-REI.3** Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.

ORGANIZING THEME/TOPIC	FOCUS CLUSTERS AND STANDARDS
UNIT 2: Linear Relationships (Systems of Equations) For A.CED.2, students will write and graph linear equations in slope intercept, point-slope and standard forms (except do not write a standard form equation given two points); connect point slope to basic transformations; view slope from a graph and a table. Students will be able to write the equations of parallel and perpendicular lines.	**A-CED Create equations that describe numbers or relationships.** • **A-CED.2*** Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales. **(8.F.B4-5)**
Focus on justification of the methods used. Build in examples with tables as well. Include cases where the two equations describe the same line (yielding infinitely many solutions) and cases where two equations describe parallel lines (yielding no solution);	**A-REI Solve systems of equations** • **A-REI.5** Prove that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a multiple of the other produces a system with the same solutions • **A-REI.6** Solve systems of linear equations exactly and approximately (e.g. with graphs), focusing on pairs of linear equations in two variables. **(8.EE.C.8a, b, c)** **A-CED Create equations that describe numbers or relationships.** • **A-CED.3*** Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or non-viable options in a modeling context. For example, represent inequalities describing nutritional and cost constraints on combinations of different foods. **(8.EE.C.7)**

ORGANIZING THEME/TOPIC	FOCUS CLUSTERS AND STANDARDS
UNIT 2: Linear Relationships (Systems of Equations)	
	A-REI Represent and solve equations and inequalities graphically
Focus on linear equations.	• **A-REI.10** Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).
Focus on cases where f(x) and g(x) are linear.	• **A.REI.11*** Explain why the x-coordinates of the points where the graphs of the equations y = f(x) and y = g(x) intersect are the solutions of the equation f(x) = g(x); find the solutions approximately, e.g. using technology to graph the functions, make tables of values, or find successive approximations. Include cases where f(x) and/or g(x) are linear .
Focus cases where f(x) and g(x) are linear inequalities. A basic (minimal constraints and whole number solutions) introduction of linear programming will be included.	• **A.REI.12** Graph the solutions to a linear inequality in two variables as a half-plane (excluding the boundary in the case of strict inequality), and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes.
The language of functions should be introduced early in this unit and applied to linear relationships (range/domain, notation, input/output, relation v. function; use of tables and graphs). Students should recognize arithmetic sequences as examples of linear functions.	**F-IF Understand the concept of a function and use function notation** • **F.IF.1** Understand that a function from one set (domain) to another set (range) assigns to each element of the domain exactly one element of the range. If f is a function and x is an element of its domain, then f(x) denotes the output of the f corresponding to the input x. The graph of is the graph of the equation y = f(x). • **F-IF.2** Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of context.

ORGANIZING THEME/TOPIC	FOCUS CLUSTERS AND STANDARDS
UNIT 2: Linear Relationships (Systems of Equations) Focus on linear functions.	**F-IF Interpret functions that arise in applications in terms of a context** • **F-IF.4*** For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. Key features: intercepts; intervals of increasing and decreasing behavior; positive or negative; relative max/min; symmetries; end behavior; and periodicity. • **F-IF.5*** Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. For example, if the function h(n) gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function. • **F-IF.6*** Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.
Include comparisons of two functions presented algebraically. For example, compare the growth of two linear functions.	**F-IF Analyze functions using different representations** • **F-IF.7*** Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. **a.** graph linear functions and show intercepts and rate of change. • **F-IF.9** Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables or by verbal descriptions). For example, given a graph of one quadratic function and an algebraic expression for another, say which has the larger maximum. **(8.F.A.2)**

ORGANIZING THEME/TOPIC	FOCUS CLUSTERS AND STANDARDS
UNIT 2: Linear Relationships (Systems of Equations)	
Limit to linear functions. Connect arithmetic sequences to linear functions.	**F-BF Build a function that models a relationship between two quantities** • **F-BF.1*** Write a function that describes a relationship between two quantities. **a.** Determine an explicit expression, a recursive process, or steps for calculations from a context. **b**. Combine standard function types using arithmetic operations. For example, build a function that models the temperature of a cooling body by adding a constant function to a decaying exponential and relate these functions to the model. • **F-BF.2*** Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms.
Focus on vertical translations of graphs of linear. Relate the vertical translation of a linear function to its y-intercept. While applying other transformations to a linear graph is appropriate at this level, it may be difficult for students to identify or distinguish between the effects of the other transformations included in this standard.	**F-BF Build new functions from existing functions** • **F-BF.3** Identify the effect on the graph of replacing $f(x)$ by $f(x) + k$, $k\,f(x)$, $f(kx)$, and $f(x + k)$ for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them.

ORGANIZING THEME/TOPIC	FOCUS CLUSTERS AND STANDARDS
UNIT 3: Exponential Relationships Introduce the properties of exponents as expanded form and create rules. Integer exponents only. Connect properties of exponents later to exponential functions for solving equations like $8^x = \left(2^3\right)^x$.	**A-SSE Interpret the structure of expressions** • 8.EE.1 Know and apply the properties of integer exponents to generate equivalent numerical expressions. For example, 32 x 3–5 = 3–3 = 1 /33 = 1 /27. • 8.EE.4 Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used. Use scientific notation and choose units of appropriate size for measurements of very large or very small quantities (e.g., use millimeters per year for seafloor spreading). Interpret scientific notation that has been generated by technology.
Focus on linear and exponential equations and be able to adapt and apply that learning to other types of equations in future courses. Focus on cases where f(x) and g(x) are linear or exponential.	**A-REI Represent and solve equations and inequalities graphically** • **A-REI.10** Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line). • **A.REI.11*** Explain why the x-coordinates of the points where the graphs of the equations y = f(x) and y = g(x) intersect are the solutions of the equation f(x) = g(x); find the solutions approximately, e.g. using technology to graph the functions, make tables of values, or find successive approximations. Include cases where f(x) and/or g(x) are linear and exponential.

ORGANIZING THEME/TOPIC	FOCUS CLUSTERS AND STANDARDS
UNIT 3: Exponential Relationships Students should experience a variety of types of situations modeled by functions. Draw examples from linear and exponential functions. Draw connection to arithmetic and geometric sequences as examples of linear and exponential functions.	**F-IF Understand the concept of a function and use function notation** • **F.IF.1** Understand that a function from one set (domain) to another set (range) assigns to each element of the domain exactly one element of the range. If f is a function and x is an element of its domain, then f(x) denotes the output of the f corresponding to the input x. The graph of f is the graph of the equation y = f(x). • **F-IF.2** Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of context.
Focus on linear functions and exponential functions whose domain is a subset of the integers. Focus on parent function, growth rate, y-intercept (initial value t=0). Consider asymptotic behavior as it relates to range and real world applications.	**F-IF Interpret functions that arise in applications in terms of a context** • **F-IF.4*** For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. Key features: intercepts; intervals of increasing and decreasing behavior; positive or negative; relative max/min; symmetries; end behavior; and periodicity. • **F-IF.5*** Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. For example, if the function h(n) gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function. • **F-IF.6*** Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.

ORGANIZING THEME/TOPIC	FOCUS CLUSTERS AND STANDARDS
UNIT 3: Exponential Relationships Focus on linear and exponential functions. Include comparisons of two functions presented algebraically. For example, compare the growth of two linear functions, or two exponential functions such as $y = 3^n$ *and* $y = 100^n$ or a linear and exponential. Focus on vertical translations of graphs of linear and exponential functions. Relate the vertical translation of a linear function to its y-intercept. While applying other transformations to a linear graph is appropriate at this level, it may be difficult for students to identify or distinguish between the effects of the other transformations included in this standard.	**F-IF Analyze functions using different representations** • **F-IF.7*** Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. **a.** graph linear and exponential functions and show intercepts and compare relative rates of change. • **F-IF.8** Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function. **b.** Use the properties of exponents to interpret expressions for exponential functions. For example, identify percent rate of change in functions such as y = (1.02)^x, y = (.97)^x, y = (1.01)^12x, y = (1.2)^x/10, and classify them as exponential growth or decay • **F-IF.9** Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables or by verbal descriptions). For example, given a graph of one exponential function and an algebraic expression for another, say which has the larger maximum. **(8.F.A.2)** **F-BF Build a function that models a relationship between two quantities** • **F-BF.1*** Write a function that describes a relationship between two quantities. **a.** Determine an explicit expression, a recursive process, or steps for calculations from a context. **b**. Combine standard function types using arithmetic operations. For example, build a function that models the temperature of a cooling body by adding a constant function to a decaying exponential and relate these functions to the model. • **F-BF.2*** Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms. **F-BF Build new functions from existing functions** • **F-BF.3** Identify the effect on the graph of replacing f(x) by f(x) + k, k f(x), f(kx), and f(x + k) for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them.

ORGANIZING THEME/TOPIC	FOCUS CLUSTERS AND STANDARDS
UNIT 3: Exponential Relationships Limit to comparisons between linear and exponential models. Limit exponential functions to those of the form $f(x)=b^x+k$ as well as $f(x)=ab^x$	**F-LQE Construct and compare linear, quadratic and exponential models and solve problems** • **F-LQE1*** Distinguish between situations that can be modeled with linear functions and with exponential functions. **a**. Prove that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals. **b**. Recognize situations in which one quantity changes at a constant rate per unit interval relative to another. **c**. Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another • **F-LQE.2** Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table). • **F-LQE.3** Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function. **F-LQE.5** Interpret the parameters in a linear, quadratic or exponential function in terms of a context.

ORGANIZING THEME/TOPIC	FOCUS CLUSTERS AND STANDARDS
UNIT 4: Descriptive Stats Students continue to describe center and spread in a data distribution. Here they choose a summary statistic appropriate to the characteristics of the data distribution, such as the shape of the distribution or the existence of extreme data points. Students take a more sophisticated look at using a linear function to model the relationship between two numerical variables. In addition to fitting a line to data, students assess how well the model fits by analyzing residuals. S.ID.6b should be focused on linear or exponential models, but may be used to preview quadratic function in Unit 5 of this course. Build on students' work with linear relationships and introduce the correlation coefficient. The focus here is on the interpretation of the correlation coefficient as a measure of how well the data fit the relationship. Use the graphing calculator to calculate the correlation coefficient.	**S-ID Summarize, represent and interpret data on a single count or measurement variable** • **S-ID.1*** Represent data with plots on the real number line (dot plots, histograms and box plots) • **S-ID.2*** 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. • **S-ID.3*** Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers) **S-ID Summarize, represent, and interpret data on two categorical and quantitative variables.** • **S-ID.5*** Summarize categorical data for two categories in two-way frequency tables. Interpret relative frequencies in the context of the data (including joint, marginal and conditional relative frequencies). Recognize possible associations and trends in the data. **(8.SP.1, 8.SP4)** • **S-ID.6*** Represent data on two quantitative variables on a scatter plot and describe how the variables are related **(8.SP.1)** **a.** Fit a function to the data; use functions fitted to data to solve problems in the context of the data. Use given functions or choose a function suggested by the context. Emphasize linear, quadratic and exponential models **b.** Informally assess the fit of a function by plotting and analyzing residuals. **c.** Fit a linear function for a scatter plot that suggests a linear association. **S-ID Interpret linear models** • **S-ID.7*** Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data **(8.SP.2, 8.SP.3)** • **S-ID.8*** Compute (using technology) and interpret the correlation coefficient of a linear fit.

ORGANIZING THEME/TOPIC	FOCUS CLUSTERS AND STANDARDS
UNIT 4: Descriptive Stats Students will have a basic understanding of probability, experimental vs. theoretical probability, independent and dependent events, and odds.	**S-CP Understand independence and conditional probability and use them to interpret data** • **S-CP.2*** Understand that two events A and B are independent if the probability of A and B occurring together is the product of their probabilities, and use this characterization to determine if they are independent. **S-IC Understand and evaluate random processes underlying statistical experiments** • **S-IC.1*** Understand statistics as a process for making inferences to be made about population parameters based on a random sample from that population. • **S-IC.2*** Decide if a specified model is consistent with results from a given data-generating process, e.g. using simulation. For example, a model says a spinning coin falls heads up with probability 0.5. Would a result of 5 tails in a row cause you to question the model?

ORGANIZING THEME/TOPIC	FOCUS CLUSTERS AND STANDARDS
UNIT 5: Quadratic Relationships	
Focus here should be on graphing quadratics and making connections with the zeros (solutions), vertices and y-intercepts. Include vertex form.	**A-REI Represent and solve equations graphically** • **A-REI.10** Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).
For F.BF.3, focus on quadratic functions. For F.BF.4a, focus on linear functions but consider simple situation where the domain of the function must be restricted in order for the inverse to exist, such as $f(x)=x^2,\ x>0$. Do not do even and odd identification.	**F.BF Build new functions from existing functions** • **F.BF.3** Identify the effect on the graph of replacing f(x) by f(x) + k, k f(x), f(kx), and f(x + k) for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them.
Focus on polynomial expressions that simplify to forms that are focused on linear or quadratic.	**A-APR Perform arithmetic operations on polynomials** **A-APR.1*** Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials

ORGANIZING THEME/TOPIC	FOCUS CLUSTERS AND STANDARDS
UNIT 5: Quadratic Relationships Note that solving methods for quadratics should not include completing the square or the quadratic formula. Discuss approximating square roots. Simplifying as an extension. Factoring should include GCF, trinomials where a is a whole number, and difference between two squares.	**A-REI Solve equations and inequalities in one variable** • **A-REI.4** Solve quadratic equations in one variable: **b.** Solve quadratic equations by inspection (e.g. for x^2=49), taking square roots, or factoring, as appropriate to the initial form of the equation. **(8.EE.A.2)** **A-SSE Write expressions in equivalent forms to solve problems** • **A-SSE.3*** Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression: **a.** Factor a quadratic expression to reveal the zeros of the function it defines
It is important to balance conceptual understanding and procedural fluency in work with equivalent expressions. For example, development of skill in factoring goes hand-in-hand with understanding what different forms of a quadratic expression reveal.	**A-SSE Interpret the structure of expressions** • **A-SSE.1*** Interpret expressions that represent a quantity in terms of its context. **a.** Interpret parts of an expression, such as terms, factors, and coefficients. **b.** Interpret complicated expressions by viewing one or more of their parts as a single entity. For example: interpret P(1+r)^n as the product of P and a factor not depending on P. • **A-SSE.2*** Use the structure of an expression to identify ways to rewrite it. For example, see $x^4 - y^4$ *as* $\left(x^2\right)^2 - \left(y^2\right)^2$, thus recognizing it as a difference of squares that can be factored

ORGANIZING THEME/TOPIC	FOCUS CLUSTERS AND STANDARDS
UNIT 5: Quadratic Relationships	**A-SSE Write expressions in equivalent forms to solve problems** • **A-SSE.3*** Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression: **a.** Factor a quadratic expression to reveal the zeros of the function it defines **c.** Use the properties of exponents to transform expressions for exponential functions. For example: $8^x = (2^3)^x$ and $27^4 = (3^3)^4$. **(8.EE.A.1-4)**
Extend work on linear and exponential equations in Units 1-3 to quadratic equations. Quadratic equations will be created through technology. Focus on the interpretation for quadratic equations. Extend A.CED.4 to formulas involving squared variables. Introduce the idea of non-Real solutions (i.e. concave up parabolas translated upwards)	**A-CED Create equations that describe numbers or relationships** • **A-CED.1** Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions. • **A-CED.4** Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. For example, rearrange Ohm's law V=IR to highlight resistance R
Include systems consisting of one linear and one quadratic equation. Include systems that lead to work with fractions.	**A-REI Solve systems of equations** • **A-REI.7** Solve a simple system consisting of a linear equation and a quadratic equation in two variables algebraically and graphically. For example, find the points of intersection between the line y = -3x and the circle x^2 +y^2 = 3

ORGANIZING THEME/TOPIC	FOCUS CLUSTERS AND STANDARDS
UNIT 5: Quadratic Relationships Continue the work with regression (use technology) in Unit 4 to apply to quadratics.	**S-ID Summarize, represent, and interpret data on two categorical and quantitative variables.** • **S-ID.6*** Represent data on two quantitative variables on a scatter plot and describe how the variables are related **(8.SP.1)** **a.** Fit a function to the data; use functions fitted to data to solve problems in the context of the data. Use given functions or choose a function suggested by the context. Emphasize linear, quadratic and exponential models **b.** Informally assess the fit of a function by plotting and analyzing residuals. **c.** Fit a function to a scatter plot that suggests a linear (exponential or quadratic) association. **S-ID Interpret linear models** • **S-ID.8*** Compute (using technology) and interpret the correlation coefficient of a best fit.

ORGANIZING THEME/TOPIC	FOCUS CLUSTERS AND STANDARDS
UNIT 5: Quadratic Relationships	
Connect N.RN.3 to physical situations, e.g., finding the perimeter of a square of area 2.	**N-RN Use properties of rational and irrational numbers** • N-RN.3 Explain why the sum or product of two rational numbers are rational; that the sum of a rational number and an irrational number is irrational; and that the product of a nonzero rational number and an irrational number is irrational.
Focus on quadratic functions; compare with linear and exponential functions studied in Units 2-3.	**F-IF Interpret functions that arise in applications in terms of a context** • **F-IF.4*** For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. Key features: intercepts; intervals of increasing and decreasing behavior; positive or negative; relative max/min; symmetries. • **F-IF.5*** Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. For example, if the function h(n) gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function.

ORGANIZING THEME/TOPIC

FOCUS CLUSTERS AND STANDARDS