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| --- | --- | --- | --- | --- | --- | --- |
| **Chapter 7: Factoring Polynomials**  7.1 Factors and Greatest Common Factor  7.2 Factoring by GCF  7.3 Factoring x2+bx+c  7.4 Factoring ax2+bx+c  7.5 Factoring Special Products  7.6 Choosing a Factoring Method  **Chapter 8: Quadratic Functions**  8.1 Identifying Quadratic Functions  8.2 Characteristics of Quadratic Functions  8.3 Graphing Quadratic Functions  8.5 Solving Quadratic Functions by Graphing  8.6 Solving Quadratic Equations by Factoring  8.7 Solving Quadratic Equations by Using Square Roots  8.9 The Quadratic Formula and the Discriminant  8.Problem Solving with Quadratic Equations (area, physics applications)  **ECA Algebra 1 Test Prep**  **Chapter 9: Exponential Functions**  9.1 Geometric Sequence  9.2 Exponential Functions  9.3 Exponential Growth and Decay | State Standards  A.1.1.3c  A1.6.6a  A1.6.7a  A1.6.7b  A1.7.2b  A1.8.2a  A1.8.2b  A1.8.3a  A1.8.3b  A1.8.4a  A1.8.4b  A1.8.4c  A1.8.4d  A1.8.6c  A1.8.6d  A1.6.8a  A1.6.8b  A1.6.8c  A1.6.8d  A1.6.8e  A1.8.7a  A1.  Common Core Standards  CC.9-  12.A.CED.3  CC.9-12.A.REI.1  CC.9-12.A.REI.4  CC.9-12.A.REI.10  CC.9-12.A.REI.11  CC.9-12.A.SSE.2  CC.9-12.A.SSE.3  CC.9-12.F.BF.2  CC.9-12.F.BF.3  CC.9-12.F.IF.2  CC.9-12.F.IF.3  CC.9-12.F.IF.4  CC.9-12.F.IF.7  CC.9-12.F.IF.8  CC.9-12.F.LE.1  CC.9-12.F.LE.2  CC.9-12.F.LE.5  Standards for Mathematical Practice  SMP1  SMP2  SMP3  SMP4  SMP5  SMP6  SMP7  SMP8 | Factoring Numbers  The Fundamental Theorem of Arithmetic  Factoring Trinomials  Factoring Polynomials  Factoring Methods  Unfactorable Polynomials  Quadratic Functions  Developing Quadratic Functions  Solving Quadratic Functions  The Discriminant  Geometric Sequences and Exponential Functions  Exponential Growth and Decay  Compound Interest | ●Write the prime factorization of numbers.  ●Find the GCF of monomials.  ●Factor polynomials by using the Greatest Common Factor.  ●Factor quadratic trinomials of the form x2+bx+c.  ●Factor quadratic trinomials of the form a x2+bx+c.  ●Factor perfect square trinomials.  ●Factor the difference of two squares.  ●Choose an appropriate method for factoring polynomials.  ●Combine methods of factoring a polynomial.  ●Identify quadratic functions and determine whether they have a minimum or maximum.  ●Graph a quadratic function and give its domain and range.  ●Find the zeros of a quadratic function from its graph.  ●Find the axis of symmetry and vertex of a parabola.  ●Graph a quadratic function in the form y= ax2+bx+c.  ●Solve quadratic equations by graphing.  ●Solve quadratic equations by factoring.  ●Solve quadratic equations by using square roots.  ●Solve quadratic equations by using the quadratic formula.  ●Recognize and extend geometric sequences.  ●Find the nth term of a geometric sequence.  ●Evaluate exponential functions.  ●Identify and graph exponential functions.  ●Solve problems involving exponential growth and decay. | Textbook assignments  Worksheet assignments  Quizzes  Tests  Oral responses  Observations  ECA Algebra 1 Exam | Textbook  Holt-McDougal Algebra 1 2011 edition  **Textbook Holt-McDougal Algebra 1 Common Core edition**  Textbook Prentice-Hall Algebra 1 2011 edition  Holt-McDougal text website  On Core Mathematics Activity Generator  Power Point Presentations  USA Test Prep  ECA Algebra 1 Item Sampler  ECA Algebra 1 Blueprint (ECA Algebra 1 Standards)  ECA Algebra 1 End of Course Released Items |  |

**COMMON CORE STANDARDS**

**UNIT 1 – COMMON CORE**

**N.Q.1** Use units as a way to understand problems and to guide the solution 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.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.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.2** Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.

**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.

**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.

**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.

**A.REI.3** Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.

**UNIT 2 – COMMON CORE**

**N.RN.1** Explain how the definition of the meaning of rational exponents follows from extending the properties of integer exponents to those values, allowing for a notation for radicals in terms of rational exponents. For example, we define 51/3 to be the cube root of 5 because we want (51/3)3 = 5(1/3)3 to hold, so (51/3)3 must equal 5.

**N.RN.2** Rewrite expressions involving radicals and rational exponents using the properties of exponents.

**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.

**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, polynomial, rational, absolute value, exponential, and logarithmic functions.★

**A.REI.12** Graph the solutions to a linear inequality in two variables as a half-plane (excluding the boundary in the case of a strict inequality), and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes.

**F.IF.1** Understand that a function from one set (called the domain) to another set (called the 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 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 a context.

**F.IF.3** Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers. For example, the Fibonacci sequence is defined recursively by f(0) = f(1) = 1, f(n+1) = f(n) + f(n-1) for n ≥ 1.

**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 include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; 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.★

**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 quadratic functions and show intercepts, maxima, and minima.

e. Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.

**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.

**F.BF.1** Write a function that describes a relationship between two quantities.★

a. Determine an explicit expression, a recursive process, or steps for calculation 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.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.

**F.LE.1** 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.LE.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.LE.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.LE.5** Interpret the parameters in a linear or exponential function in terms of a context.

**UNIT 3 – COMMON CORE**

**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.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.

**S.ID.6** Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.

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 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.7** Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.

**S.ID.8** Compute (using technology) and interpret the correlation coefficient of a linear fit.

**S.ID.9** Distinguish between correlation and causation.

**UNIT 4 – COMMON CORE**

**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 x4 – y4 as (x2)2 – (y2)2, thus recognizing it as a difference of squares that can be factored as (x2 – y2)(x2 + y2).

**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.

b. Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines.

c. Use the properties of exponents to transform expressions for exponential functions. *For example the expression 1.15t can be rewritten as (1.151/12)12t* ≈ *1.01212t to reveal the approximate equivalent monthly interest rate if the annual rate is 15%.*

**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.

**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.2** Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.

**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.

**A.REI.4** Solve quadratic equations in one variable.

a. Use the method of completing the square to transform any quadratic equation in x into an equation of the form (x – p)2 = q that has the same solutions. Derive the quadratic formula from this form.

b. Solve quadratic equations by inspection (e.g., for x2 = 49), taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as a ± bi for real numbers a and b.

**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 x2 + y2 = 3.

**UNIT 5 – COMMON CORE**

**N.RN.3** Explain why the sum or product of two rational numbers is 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.

**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 include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; 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.★

**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 quadratic functions and show intercepts, maxima, and minima.

b. Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.

**F.IF.8** Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.

a. Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context.

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)t, y = (0.97)t, y = (1.01)12t, y = (1.2)t/10, and classify them as representing 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 quadratic function and an algebraic expression for another, say which has the larger maximum.

**F.BF.1** Write a function that describes a relationship between two quantities.★

a. Determine an explicit expression, a recursive process, or steps for calculation 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.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.

**F.BF.4** Find inverse functions.

a. Solve an equation of the form f(x) = c for a simple function f that has an inverse and write an expression for the inverse. For example, f(x) = 2 x3 or f(x) = (x+1)/(x-1) for x ≠ 1.

**F.LE.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.

**Indiana Academic Standards**

**Unit-Quarter 1 :: Topic-Reasoning with Equations and Inequalities**

A1.1.3a Simplify expressions by using the associative and commutative properties to combine like terms.

A1.1.3b Simplify linear expressions by using the distributive property.

A1.2.1a Determine which inverse operations should be applied and in what order to solve a given linear equation.

A1.2.1b Solve linear equations that require the use of commutative and associative properties to combine like terms.

A1.2.1c Solve linear equations that require the use of the distributive property to remove grouping symbols.

A1.2.1d Solve linear equations with the variables on both side of the equation.

A1.2.2a Solve equations and formulas for a specified variable.

A1.2.3 Find solution sets of linear inequalities when possible numbers are given for the variable.

A1.2.4a Solve linear inequalities that require the use of commutative and associative properties to combine like terms.

A1.2.4b Solve linear inequalities that require the use of the distributive property to remove grouping symbols.

A1.2.4c Solve linear inequalities with the variables on both side of the inequality.

A1.2.4d Graph the solution set of a linear inequality in one variable (on a number line).

A1.2.5a Solve compound linear inequalities.

A1.2.5b Graph the solution set of combined linear inequality in one variable (on a number line).

A1.2.6a Solve word problems that involve linear equations.

A1.2.6b Solve word problems that involve formulas.

A1.2.6c Solve word problems that involve linear inequalities.

A1.7.2a Solve algebraic proportions that lead to linear equations.

**Unit-Quarter 1 :: Topic-Algebraic Modeling - Linear Functions**

A1.3.3e Translate between a table, an equation, a graph and a verbal description, given at least one of the representations.

A1.4.1a Graph a linear equation given slope-intercept form.

A1.4.1b Graph a linear equation given in standard form.

A1.4.1c Graph a linear equation in any form.

A1.4.2a Find the slope of a line given its graph.

A1.4.2b Find the slope of a line given its equation.

A1.4.2c Find the slope of a line given two points on the line.

A1.4.2d Find the x-intercept and the y-intercept of a line given its graph.

A1.4.2e Find the x-intercept and the y-intercept of a line given its equation.

A1.4.2f Find the x-intercept and the y-intercept of a line given two points on the line.

A1.4.3a Write the equation of a line in slope-intercept form, given the slope and the y-intercept.

A1.4.3b Write the equation of a line in slope-intercept form, given a graph.

A1.4.3c Demonstrate how the slope and y-intercept of the graph are related to an linear equation in slope-intercept form.

A1.4.3d Write the equation of a line in slope-intercept form, given the standard form.

A1.4.3e Write the equation of a line in slope-intercept form, given a table.

A1.4.3f Write the equation of a line in slope-intercept form, given a verbal description.

A1.4.4a Write the equation of a line given two points on the line.

A1.4.4b Write the equation of a line given one point on the line and an equation of a parallel line.

A1.4.4c Write the equation of a line given one point on the line and an equation of a perpendicular line.

A1.4.4d Write the equation of a line, given a combination of points on the line, x- or y-intercepts, or the slope of the line.

**Unit-Quarter 1 :: Topic-Standards for Mathematical Practice**

SMP1. Make sense of problems and persevere in solving them.

SMP2. Reason abstractly and quantitatively.

SMP3. Construct viable arguments and critique the reasoning of others.

SMP4. Model with mathematics.

SMP5. Use appropriate tools strategically.

SMP6. Attend to precision

SMP7. Look for and make use of structure.

SMP8. Look for and express regularity in repeated reasoning.

**Unit-Quarter 2 :: Topic-Reasoning with Equations and Inequalities**

A1.3.3e Translate between a table, an equation, a graph and a verbal description, given at least one of the representations.

A1.4.5a Write the equation of a line that models a data set.

A1.4.5b Use the equation of a line or the graph of the equation to make predictions with a given data set.

A1.4.5c Find the slope of the line described by a given data set.

A1.4.5d Determine the rate of change for a specified measure based on the equation or graph for a given set of data.

A1.4.6a Graph a linear inequality in two variables.

A1.5.1a Explain that the solution of a pair of linear equations in two variables is the intersection of their graphs.

A1.5.1b Estimate the solution of a pair of linear equations in two variables by graphing.

A1.5.2a Graph a pair of linear inequalities on the same coordinate plane.

A1.5.2b Shade the region of the graph that represents the solution set of a pair of linear inequalities.

A1.5.2c Identify the solution set of a pair of linear inequalities in two variables given their graphs.

A1.5.3a Solve a pair of linear equations in two variables by using the substitution method.

A1.5.4a Solve a pair of linear equations in two variables by elimination using addition or subtraction.

A1.5.5a Solve a pair of linear equations in two variables by elimination using multiplication with addition or subtraction.

A1.5.6a Write a pair of linear equations from information provided in a word problem.

A1.5.6b Determine whether graphing, substitution, or elimination would be the most appropriate technique for given set of linear equations.

A1.5.6c Solve word problems involving pairs of linear equations.

**Unit-Quarter 2 :: Topic-Interpreting Functions**

A1.3.1a Apply appropriate labels and intervals to each axis.

A1.3.1b Sketch a reasonable graph for a given relationship.

A1.3.2a Describe relationships between two measures on the horizontal and vertical axes

A1.3.2b Explain what is going on at a specific point or during a particular interval on a graph.

A1.3.3a Identify the criteria for a relationship to be considered a function.

A1.3.3b Determine whether a list or table of ordered pairs represents a function

A1.3.3c Determine whether a given graph represents a function

A1.3.3d Determine whether a given equation represents a function

A1.3.3e Translate between a table, an equation, a graph and a verbal description, given at least one of the representations.

A1.3.4a Find the domain and range of a list or table of ordered pairs

A1.3.4b Find the domain and range of a given graph

A1.3.4c Find the domain and range of a given equation

**Unit-Quarter 2 :: Topic-Standards for Mathematical Practice**

SMP1. Make sense of problems and persevere in solving them.

SMP2. Reason abstractly and quantitatively.

SMP3. Construct viable arguments and critique the reasoning of others.

SMP4. Model with mathematics.

SMP5. Use appropriate tools strategically.

SMP6. Attend to precision

SMP7. Look for and make use of structure.

SMP8. Look for and express regularity in repeated reasoning.

**Unit-Quarter 3 :: Topic-Arithmetic with Polynomials and Rational Expressions**

A1.1.1a Evaluate real number expressions

A1.1.1b Order real number expressions

A1.1.3a Simplify expressions by using the associative and commutative properties to combine like terms.

A1.1.3d Simplify polynomial expressions by using the distributive property.

A1.1.4a Identify root and power of rational exponents

A1.1.4b Simplify real number expressions with rational exponents.

A1.1.4c Simplify algebraic expressions with rational exponents.

A1.6.1a Define and identify monomial and polynomial.

A1.6.1b Add and subtract monomials.

A1.6.1c Add and subtract polynomials.

A1.6.2a Multiply and divide monomials.

A1.6.3a Find powers of monomials.

A1.6.3b Find roots of monomials (only when the answer has an integer exponent).

A1.6.4a Multiply monomials by binomials.

A1.6.4b Multiply monomials by polynomials.

A1.6.4c Multiply binomials by binomials.

A1.6.4d Multiply polynomials by polynomials.

A1.6.5a Divide polynomials by monomials.

**Unit-Quarter 3 :: Topic-Reasoning with Equations and Inequalities**

A1.1.3c Simplify quadratic expressions by using the distributive property.

A1.6.6a Find the greatest common monomial factor in a polynomial and rewrite the polynomial in factored form.

A1.6.7a Factor quadratics that are a difference of two squares.

A1.6.7b Factor quadratic equations.

A1.7.2b Solve algebraic proportions that lead to quadratic equations.

A1.8.2a Explain the Zero Product Rule in relation to solving factored quadratic equations.

A1.8.2b Solve quadratic equations by factoring completely and then applying the Zero Product rule.

A1.8.3a Solve quadratic equations in which a perfect square equals a constant.

A1.8.3b Solve quadratic equations in which a binomial squared equals a constant.

A1.8.4a Identify perfect square trinomials

A1.8.4b Construct a perfect square trinomial by completing the square, given the first two terms of the trinomial.

A1.8.4c Factor perfect square trinomials and rewrite as a quantity squared.

A1.8.4d Complete the square to solve quadratic equations

**Unit-Quarter 3 :: Topic-Standards for Mathematical Practice**

SMP1. Make sense of problems and persevere in solving them.

SMP2. Reason abstractly and quantitatively.

SMP3. Construct viable arguments and critique the reasoning of others.

SMP4. Model with mathematics.

SMP5. Use appropriate tools strategically.

SMP6. Attend to precision

SMP7. Look for and make use of structure.

SMP8. Look for and express regularity in repeated reasoning.

**Unit-Quarter 4 :: Topic-Seeing Structure in Expressions**

A1.1.2a Simplify square roots using factors

A1.1.2b Simplify rational expressions with square roots.

A1.8.5a Derive the quadratic formula by completing the square.

A1.8.6a Simplify expressions that contain radicals.

A1.8.6b Determine the decimal approximation of expressions with radicals.

A1.8.6c Determine the value of a, b and c from a quadratic equation.

A1.8.6d Solve quadratic equations by using the quadratic formula.

**Unit-Quarter 4 :: Topic-Algebraic Modeling - Quadratic Functions**

A1.6.8a Identify the x-intercepts and zeros of a given quadratic graph.

A1.6.8b Identify the solutions of quadratic equations.

A1.6.8c Identify the zeros of quadratic functions.

A1.6.8d Solve a quadratic equation by graphing.

A1.6.8e Describe the relationships among the x-intercepts of a quadratic graph, the solutions of a quadratic equation, the zeros of a quadratic function, and the factors of a quadratic expression.

A1.8.1a Graph quadratic equations both with positive and with negative leading coefficients.

A1.8.1b Graph cubic equations both with positive or with negative leading coefficients.

A1.8.1c Identify the basic shape of the graph of a radical function.

A1.8.1d Graph radical equations with positive or negative leading coefficients

A1.8.7a Solve word problems that involve quadratic equations.

A1.8.8a Solve equations that contain radical expressions equal to a constant.

A1.8.8b Solve equations that contain radical expressions equal to the variable in the expression.

A1.8.9a Use graphing technology to find approximate solutions of quadratic equations.

A1.8.9b Use graphing technology to find approximate solutions of cubic equations.

**Unit-Quarter 4 :: Topic-Arithmetic with Polynomials and Rational Expressions**

A1.1.5a Use dimensional unit analysis to organize conversions and computations

A1.7.1a Simplify algebraic ratios.

A1.7.2a Solve algebraic proportions that lead to linear equations.

A1.7.2b Solve algebraic proportions that lead to quadratic equations.

A1.7.2c Solve algebraic proportions that lead to polynomial equations.

**Unit-Quarter 4 :: Topic-Standards for Mathematical Practice**

SMP1. Make sense of problems and persevere in solving them.

SMP2. Reason abstractly and quantitatively.

SMP3. Construct viable arguments and critique the reasoning of others.

SMP4. Model with mathematics.

SMP5. Use appropriate tools strategically.

SMP6. Attend to precision

SMP7. Look for and make use of structure.

SMP8. Look for and express regularity in repeated reasoning.