Course Title:	Introduction to Consumer Mathematics
Grade Level(s):	10, 11, 12
Length of Course:	One Year or Equivalent Term
Credit:	10 units
Prerequisite:	Completion of Pre-Algebra
Co-requisite:	None

Course Overview:

Introduction to Consumer Math is an algebra-based, mathematical modeling course that will solve applications that occur in everyday financial life. The purpose of this course is to lay a foundation in both logical thinking and problem solving while applying these skills to everyday financial decisions. Students will expand gain a deeper understanding of Algebra I by directly relating standards and lesson topics to common consumer problems they will face in the real world. Lesson topics will include rational numbers, algebraic expressions, analyzing and solving linear equations and inequalities, data analysis, probability, statistics, and polynomials. Students will learn skills to help them understand the cost of operating a vehicle, income, budgeting, buying and renting a home, filing taxes, banking, investments, and calculating business profits and losses. Students will investigate relationships between variables and solve problems using equations, graphs, and tables; specifically, they will do so through the lens of consumer mathematics. Students will then be able to apply these skills to real-life circumstances.

Schools Offering:	Del Valle High School
	Granada High School
	Livermore High School
	Vineyard High School
	YouthBuild Program
Meets University of California Entrance Requirements:	Seeking "c" approval; (discipline: Algebra 1)
Board Approval:	*Pending Board Approval*
Course Materials:	Personal Finance, Jack Kapoor, Les Dlabay, Robert J. Hughes, and Melissa Hart, McGraw Hill, 2020, ISBN10: 1260013995; ISBN13: 9781260013993;

https://www.mheducation.com/highered/product/personal-finance-kapoor-dlabay/M9781260013993.html

Foundations in Personal Finance: High School Edition, Dave Ramsey, Ramsey Press, 2018, https://www.ramseysolutions.com/education

Managing Your Personal Finances, Joan S. Ryan, South-Western Cengage Learning, 2010, https://jumpstartclearinghouse.org/resource/managing-your-personal-finances-6th-edition/

Supplemental Materials: Online Resources, printed consumables, teacher created materials.

Introduction to Consumer Mathematics

COURSE CONTENT:

Unit 1: Career Preparation

In this unit, students will focus on real number operations, variables, and equations. They will learn about number properties, rational numbers, real number operations, translating and simplifying algebraic expressions, and solving multi-step equations. Students will learn to manipulate variables, translate phrases into numerical expressions and vice versa, and simplify and evaluate expressions using real number properties. Students will focus on manipulating real-world problems and relating them to the real number system, learn the basic properties of irrational and rational numbers, and use quantitative reasoning to model/solve problems involving career preparation. Students will build a solid foundation of evaluating, simplifying, and writing algebraic expressions and ground their learning in career preparation problems.

Students will apply what they learn to real-world situations:

- Research and prepare for future careers.

- Research certification/degree programs and costs.

- Compare careers and program requirements.

Assignments

Students will complete a variety of assignments (worksheets, discussion questions, word problems, data analysis, analytical reading, quizzes) throughout the entire unit. Students will also complete at least one of the following key assignments listed below:

a) Students will complete an end-of-unit assessment prepared by the course instructor.

b) Students will compare and contrast the paths necessary to reach chosen possible future careers, including undergraduate, graduate, certification, internship, job experience, recommendations, etc. Students will complete a cost-benefit analysis of the initial capital investment needed to start a career path and the expected income after 1/5/10 years in the career.

c) Students will select a college and find out the cost of tuition, room and board (if necessary) and, fees over the past ten years. They set up a regression line or curve of best fit. They then predict the cost of a college education in 18 years (as if they just had a child and were trying to save for college). They will then use the prevailing interest rate and the future value formula to determine the monthly periodic deposit that would be necessary to have the full college cost saved by the child's 18th birthday. Students will then repeat the problem with interest rates slightly higher than the prevailing rate.

d) Students will play and analyze *The Game of Life*. The board game simulates a person's life and includes various life events (college, jobs, home purchase, marriage, children) that may impact the player's finances. After playing the board game, students will analyze the gameplay. Students may write a reflection paper discussing how accurate the game is and

how it differs from real-life finances. Students may also choose to devise their own version of the board game instead; they may make improvements so their version mimics current market trends.

e) Students will design and complete an educationally equivalent instructor-approved option.

Unit 2: Income

In this unit, students will focus on using equations. They will build on their understanding of writing and solving inequalities. Students will learn how to write equations in different forms, study various parts of linear equations, and understand the relationship between parallel and perpendicular lines. Students will define variables, set limits, write linear equations, and use inequalities to represent career-related parameters. They will evaluate equations to solve salary, commission, and interest problems. Students will be able to solve for missing variables, rearrange formulas to highlight the quantity of interest, and use equations and inequalities to describe relationships between quantities they are studying.

Students will apply what they learn to real-world situations:

- Calculate gross pay and net pay.

- Understand overtime and sales commission.

- Know the sources of payroll deductions.

- Compare salaries, commissions, expenses, gross wages, and taxes.

- Understand costs associated with self-employment.

Assignments

Students will complete a variety of assignments (worksheets, discussion questions, word problems, data analysis, analytical reading, quizzes) throughout the entire unit. Students will also complete at least one of the following key assignments listed below:

a) Students will complete an end-of-unit assessment prepared by the course instructor.

b) Students will research the current State/federal minimum wage, cost of living, and debates surrounding minimum wage. After researching minimum wage, students will determine the cost of living in their current city and determine what the minimum wage should be. Students will compare whether their minimum wage is above or below what the State/federal minimum wage is currently set at. Students will then make an argument either for or against raising the current minimum wage. They will need to base their arguments on data they have collected and show their findings through mathematical means.

c) Students will research the differences between net pay and gross pay. Students will choose a future career, research the average salary, and compute typical benefits packages and deductions. Students will compare their net pay with their gross pay.

d) Students will compare and contrast various pay rates (salary, hourly, commission, tips, etc.). Students will choose at least three careers with different pay rates and calculate what it will take to make a gross pay of $75,000 a year. Students will develop different mathematical equations to represent the various scenarios and analyze their findings.

e) Students will design and complete an educationally equivalent instructor-approved option.

Unit 3: Shopping

In this unit, students will focus on solving inequalities and studying relations and functions. They will deepen their understanding of inequalities and apply the properties of inequality to solve world problems grounded in real-world situations. Students will graph inequalities on the number line, use the properties of inequality to solve problems and apply what they learn to compare prices. Students will also learn to graph points and equations on the Cartesian coordinate plane; they will represent relations and functions using sets of ordered pairs, tables, equations, and graphs. They will focus on representing mathematical relationships through functions and model budgetary constraints using equations and inequalities. Students will learn how to determine which option is best suited for their needs based on mathematical models.

Students will apply what they learn to real-world situations:

- Research the cost of everyday necessities.

- Compare prices of food, clothing, cell phone plans, and other family expenses.

- Learn how to calculate rebates, coupons, markdowns, discount percentages, and sales tax to find the true price of an item.

- Study the role of supply and demand on the price of an item.

- Develop money-saving strategies.

Assignments

Students will complete a variety of assignments (worksheets, discussion questions, word problems, data analysis, analytical reading, quizzes) throughout the entire unit. Students will also complete at least one of the following key assignments listed below:

a) Students will complete an end-of-unit assessment prepared by the course instructor.

b) Students will choose five consumer goods and research the prices of their goods throughout the past year. Students will gather their findings in a data table and graph the results. Students will need to compare sales prices and determine whether Black Friday deals are worth it. They will need to analyze their findings and develop a theory as to why prices fluctuate throughout the year.

c) Students will create three different meal plans for three families of four members. Students can determine the prices of food items using weekly grocery ads and research local restaurant menu prices. They will need to plan for three different families of four that have a thrifty ($550 per month), modest ($900 per month), and liberal ($1,200 per month) food

budget. Students should meal plan for one week for each family, create a spreadsheet of the grocery list and costs, and reflect on their findings.

d) Students will plan three different prom scenarios with three different budgets. Students will need to research the average cost of prom, and they will need to set a thrifty, modest, and liberal budget for prom. Students will then plan a prom night, consider all the costs (dinner, outfit, accessories, flowers, limo, etc.), and go shopping! Students will work within the constraints of their budgets and use money-saving strategies. They will need to factor in sales tax. At the end of it all, students will determine if prom is worth the cost and which budget is the right one for them.

e) Students will design and complete an educationally equivalent instructor-approved option.

Unit 4: Transportation

In this unit, students will focus on linear functions. They will graph linear equations, determine the x- and y- intercepts, find the slope of a given line, and solve equations. Students will be able to represent linear equations in slope-intercept form, determine a trend line from a scatterplot, and graph linear inequalities. Students will use linear equations to model problems involving transportation costs.

Students will apply what they learn to real-world situations:

- Understand the costs of buying a car.

- Understand the types of automobile insurance, how deductibles work, and the limitations of coverage.

- Calculate interest and monthly payments.

- Understand depreciation as a function of time.

- Compute operation cost as a function of time and mileage.

- Compare fuel efficiency (average MPG) for different car models.

Assignments

Students will complete a variety of assignments (worksheets, discussion questions, word problems, data analysis, analytical reading, quizzes) throughout the entire unit. Students will also complete at least one of the following key assignments listed below:

a) Students will complete an end-of-unit assessment prepared by the course instructor.

b) Students will compile the knowledge learned to date and create a spreadsheet documenting the Annual Operating Cost of owning a car. A separate spreadsheet will be created comparing the Annual Operating Cost of leasing a car.

c) Students will demonstrate an understanding of annual depreciation, interest, repairs, gas, oil, insurance, and payments. Students will calculate the cost per mile for operating and maintaining a vehicle.

d) Students will compare new and used vehicle prices. Students will compute the equity and depreciation of a new car to that of a used car.

e) Students will design and complete an educationally equivalent instructor-approved option.

Unit 5: Travel & Leisure

In this unit, students will focus on linear systems. They will expand their understanding of a system of equations by demonstrating how to solve each system in multiple ways. Students will solve linear equations using three different methods: graphing, substitution, and elimination. Students will be able to classify systems of equations as consistent versus inconsistent and dependent versus independent. They will research and compare various types of travel expenses and model budgetary constraints using a system of equations.

Students will apply what they learn to real-world situations:

- Calculate and compare the cost of different types of travel (i.e., plane, bus, train, car)

- Demonstrate knowledge of time zones and currency conversion rates.

- Compare the prices and living space of accommodations.

Assignments

Students will complete a variety of assignments (worksheets, discussion questions, word problems, data analysis, analytical reading, quizzes) throughout the entire unit. Students will also complete at least one of the following key assignments listed below:

a) Students will complete an end-of-unit assessment prepared by the course instructor.

b) Students will use analytical skills to compare modes of transportation for a trip of their choosing. Students will create a spreadsheet outlining the cost for each including the cost of gas, lodging, food, airfare, taxi cost, sleeper cars vs. regular train seats, etc. Students will then organize the modes of travel from most expensive to least expensive and give one advantage and one disadvantage for each.

c) Students will use analytical skills to compare modes of lodging for a trip of their choosing. Students will create a spreadsheet outlining the cost for each including the cost of Airbnb, motels, hotels, etc. Students should also research hotels with different ratings for a price and amenities comparison. Students will then organize the lodging types from most expensive to least expensive and give one advantage and one disadvantage for each.

d) Students will plan three international spring break vacations. Students will need to calculate airfare, transportation, lodging, food, and daily expenses. To obtain the greatest variety, students should select three destinations located in three different countries. Students will

compare the costs of traveling to each destination. They will need to factor in currency exchange rates.

e) Students will design and complete an educationally equivalent instructor-approved option.

Unit 6: Banking & Loans

In this unit, students will multiply and divide expressions containing exponents. They will learn how to simplify expressions with exponents and graph exponential functions. Students will understand how to interpret the compound interest formula, rearrange the structure to isolate the variable of interest and use reasoning to solve the equations. Students will also learn how to convert between exponential form and radical form; given certain quantities, students will be able to either calculate the investment amount or interest rate. They will be able to simplify, multiple, divide, add, and subtract radical expressions. Students will be able to build functions that model the relationship between initial investments, interest rates, loans, and debt owed.

Students will apply what they learn to real-world situations:

- Understand different accounts available at banks and credit unions.

- Recognize various charges associated with bank accounts and how they are computed.

- Understand how interest-bearing accounts work.

- Apply the compound interest formula to compute the balance in an account for different lengths of compounding periods.

- Understand how loans and credit cards work.

- Compute monthly and yearly interest rates.

- Calculate interest charges on unpaid balances.

Assignments

Students will complete a variety of assignments (worksheets, discussion questions, word problems, data analysis, analytical reading, quizzes) throughout the entire unit. Students will also complete at least one of the following key assignments listed below:

a) Students will complete an end-of-unit assessment prepared by the course instructor.

b) Using a simple interest formula, students will calculate the amount of interest to be paid on different loans with different terms and the total amount to be repaid. Students will research various loans they will need for the next five years and calculate the interest and payment for various types of loans, including car loans, student loans, and credit cards.

c) Students will compute interest for each interest period over a semi-annual and quarterly compounded account for a given balance and interest rate. They will derive the general algebraic formulas for these two types of compounding. They will then look for patterns in the semi-annual and quarterly compound interest formulas to inductively conjecture about

the general formula for compounding. They will then find formulas for monthly, weekly, daily, and hourly compounding, and compute and compare the interest earned over one year for these accounts.

d) Students will research various credit card companies and devise a comparison chart. Students will articulate how credit card purchases, payment decisions, and interest rates can affect long-term money management. Students will also calculate monthly credit card finance charges for a given balance and interest rate.

e) Students will design and complete an educationally equivalent instructor-approved option.

Unit 7: Housing

In this unit, students will focus on polynomials. They will add, subtract, and multiply polynomials. They will also learn to factor trinomials, graph quadratic functions, and solve quadratic equations. Students will be able to recognize special binomial products and use their patterns to compute products. They will be able to model rent and mortgage costs using binomials. Students will learn to model the relationship between mortgage payments and the initial down payment through graphs, functions, and tables. They will be able to recognize that sequences are functions and apply what they learn to amortization schedules.

Students will apply what they learn to real-world situations:

- Compare the cost of renting a home versus buying a home with mortgage payments.

- Create an amortization schedule.

- Learn how interest rates affect mortgage payments.

- Compute property tax, insurance costs, and monthly payments.

- Compute the surface area within a home.

- Calculate remodeling costs and needs.

- Calculate utility bills.

Assignments

Students will complete a variety of assignments (worksheets, discussion questions, word problems, data analysis, analytical reading, quizzes) throughout the entire unit. Students will also complete at least one of the following key assignments listed below:

a) Students will complete an end-of-unit assessment prepared by the course instructor.

b) Students will research and choose a home for sale and a home for rent (of comparable size) in our local area, compare the cost of buying vs. renting (including deposits). Students will then research and document the cost of utilities for the chosen homes to include electricity, gas, water, and garbage service. Students will present findings to the class using graphs and charts and tell which house they would choose based on their budget.

c) Students will calculate the average cost of housing during college. Students will need to devise different housing budgets for (1) commuting to school; (2) living in a dorm; and (3) living off-campus in an apartment. After researching each housing option, students will compare the costs and benefits of each and present which option they would choose. Students will need to represent their findings using a system of equations.

d) Students will choose their dream home and calculate their mortgage payments. Students will choose a down payment amount and compare different loan interest rates (15-year, 30-year, variable rate). They will also need to take into consideration property taxes for the city they live in. Students will then determine the income required to maintain their dream home and consider what the maximum affordable monthly payment will be. Students will need to construct monthly payment spreadsheets using algebraic formulas that take into consideration the loan length and interest percentage.

e) Students will design and complete an educationally equivalent instructor-approved option.

Unit 8: Investments

In this unit, students will focus on quadratic functions and equations. They will solve quadratic equations by graphing, completing the square, and using the Quadratic Formula. They will be able to analyze functions and identify special functions. Students will review factoring common polynomials and recognizing special patterns. Students will be able to model market fluctuations with various equations (i.e., linear, quadratic, logarithmic). Given two points, students will also be able to calculate the average rate of change over time and determine the stability of an investment by the shape of the graph. At the end of the unit, students will be able to represent investment concepts using various mathematical expressions (return on equity, future value, total return, stock price, price-earnings ratio, compounding interest) and understand what each variable means.

Students will apply what they learn to real-world situations:

- Study various investment types (i.e. insurance, stocks, bonds, property).

- Analyze the pros and cons of investments and associated risks of stocks and bonds.

- Read stock quotations.

- Compute the cost of a stock purchase, brokerage fees, and price-to-earnings ratios.

- Compute stock dividends.

- Model stock market fluctuations over time using quadratic functions.

- Calculate stock price and worth at a given time.

Assignments

Students will complete a variety of assignments (worksheets, discussion questions, word problems, data analysis, analytical reading, quizzes) throughout the entire unit. Students will also complete at least one of the following key assignments listed below:

a) Students will complete an end-of-unit assessment prepared by the course instructor.

b) Students will create a savings plan and make an investment comparison between six types of savings and investment accounts (stocks, bonds, mutual funds). They will compare the investment results of $5000.00 per account over the term of three years and determine which is the most lucrative.

c) Students will research and choose five stocks to invest in. They will compare the investment results of $5000.00 per account over the next month. Students will act as investors and use various sources of information (Internet, newspapers, news programs, business periodicals, government publications, corporate reports, investor services, newsletters, and historical data) to make investment decisions. At the end of one month, students will need to summarize their stock portfolio using key terms and formulas (earnings per share, price-earnings ratios, dividend yields, total return). They will need to present their information and reasoning behind their investment choices.

d) Students will research alternative methods of investment (real estate, precious metals, gems, collectibles). Students will compare the pros and cons of investing using alternative methods, calculate the initial capital needed to invest, and calculate the profit margins over the next 1/5/10 years.

e) Students will design and complete an educationally equivalent instructor-approved option.

Unit 9: Budgeting

In this unit, students will focus on rational functions and equations. They will simplify, add, subtract, multiply, and divide rational expressions. They will simplify complex and mixed rational expressions. Students will solve and graph rational equations. Students will use a variety of linear, quadratic, and exponential models to represent the situation and their budget at a given time.

Students will apply what they learn to real-world situations:

- Organize major expense categories and calculate expenses over a period of time.

- Create a weekly, monthly, annual budget.

- Split bills and costs.

- Convert measurements and calculate costs given various unit prices.

- Read gas and electricity meters, and estimate utility bills based on energy usage.

Assignments

Students will complete a variety of assignments (worksheets, discussion questions, word problems, data analysis, analytical reading, quizzes) throughout the entire unit. Students will also complete at least one of the following key assignments listed below:

a) Students will complete an end-of-unit assessment prepared by the course instructor.

b) Students will create an annual budget with a month-to-month table that aligns with their varying spikes in expenses such as birthday gifts, vacations, and holiday expenses. They will have to determine what they can afford based on their actual income, or on an income assigned to them. They will have to determine where to make cuts so that their income will equal expenses plus savings. Students will use what they have learned in this unit to represent real-world situations using the appropriate tables, graphs, and equations.

c) Students will create a personal balance sheet, either for themselves or for a family member. Balance sheets report what you own and what you owe, and are a great tool for financial planning. Students research sample balance sheets and create one themselves. They should consider liquid assets, real estate, personal possessions, investment assets, current liabilities, and long-term liabilities. Students will be able to calculate the net worth at the end of the balance sheet.

d) Students will determine a financial plan based on their goals for the next 10 years. Students should determine what level of education they wish to obtain, their ideal career, and whether they plan to start a family. They will need to set short-term goals and long-term goals, research the cost of each goal, and develop a budget. Students will need to work within their estimated income, model their projected income using equations, and represent their budget using a system of equations and inequalities. They will need to budget for an emergency fund, periodic expenses, and daily living expenses.

e) Students will design and complete an educationally equivalent instructor-approved option.

Unit 10: Federal Taxes & Records

In this unit, students will learn real-world skills needed to maintain and understand financial records. They will learn about various tax forms, evaluate paystubs, and study income tax brackets. Students will build upon their financial literacy throughout the entire course; in this last unit, they will learn about different financial records and strategies for keeping those records.

Students will apply what they learn to real-world situations:

- Calculate employee and employer contributions to retirement funds.

- Fill out W-4 form and understand how that determines how much income tax is withheld from wages.

- Determine payroll deductions and calculate net pay.

- Fill out federal income tax forms.

- Understand the purpose of a W-2.

Assignments

Students will complete a variety of assignments (worksheets, discussion questions, word problems, data analysis, analytical reading, quizzes) throughout the entire unit. Students will also complete at least one of the following key assignments listed below:

a) Students will complete an end-of-unit assessment prepared by the course instructor.

b) Students will be given scenarios of different types of individuals and families and prepare either a 1040EZ or 1040A using current tax regulations, current tax tables and find their tax liability. Students will be able to identify different tax forms (W4, W2, 1040EZ, 1040, 1099-MISC, and 8962) and their uses.

c) Students will understand how to read a pay stub and differentiate between gross and net pay. Students will be able to calculate net pay given state taxes, social security, Medicare, and other deductions.

d) Students will be able to calculate expected federal taxes based on the tax bracket, number of dependents, allowances, and withholdings. Students will create a hypothetical situation in which they will calculate the appropriate federal taxes.

e) Students will design and complete an educationally equivalent teacher-approved option.

California Common Core Standard Standards
High School Algebra Standards

Interpret the structure of expressions.
   (SSE.A.1) Interpret expressions that represent a quantity in terms of its context.
   (SSE.A.2) Use the structure of an expression to identify ways to rewrite it.

Write expressions in equivalent forms to solve problems.
   (SSE.B.3) Choose and produce an equivalent form of an expression to reveal and explain
                properties of the quantity represented by the expression.
   (SSE.B.4) Derive the formula for the sum of a finite geometric series (when the common ratio is
                not 1), and use the formula to solve problems. *For example, calculate mortgage
                payments.*

Perform arithmetic operations on polynomials.
   (APR.A.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.

Understand the relationship between zeros and factors of polynomials.
   (APR.B.2) Know and apply the Remainder Theorem: For a polynomial $p(x)$ and a number a, the
                remainder on division by $x - a$ is $p(a)$, so $p(a) = 0$ if and only if $(x - a)$ is a factor
                of $p(x)$.
   (APR.B.3) Identify zeros of polynomials when suitable factorizations are available, and use the
                zeros to construct a rough graph of the function defined by the polynomial.

Use polynomial identities to solve problems.
   (APR.C.4) Prove polynomial identities and use them to describe numerical relationships.
   (APR.C.5) Know and apply the Binomial Theorem for the expansion of $(x + y)^n$ in powers
                of x and y for a positive integer n, where x and y are any numbers, with coefficients
                determined for example by Pascal's Triangle.[1]

Rewrite rational expressions.
(APR.D.6) Rewrite simple rational expressions in different forms.
(APR.D.7) Understand that rational expressions form a system analogous to the rational numbers, closed under addition, subtraction, multiplication, and division by a nonzero rational expression; add, subtract, multiply, and divide rational expressions.

Create equations that describe numbers or relationships.
(CED.A.1) Create equations and inequalities in one variable and use them to solve problems.
(CED.A.2) Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.
(CED.A.3) Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context. *For example, represent inequalities describing nutritional and cost constraints on combinations of different foods*.
(CED.A.4) Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations.

Understand solving equations as a process of reasoning and explain the reasoning.
(REI.A.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.
(REI.A.2) Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.

Understand solving equations as a process of reasoning and explain the reasoning.
(REI.A.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.
(REI.A.2) Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.

Solve equations and inequalities in one variable.
(REI.B.3)　 Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.
(REI.B.4)　 Solve quadratic equations in one variable.
(REI.B.4.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.
(REI.B.4.B) Solve quadratic equations by inspection (e.g., for $x^2 = 49$), taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation.

Solve systems of equations.
(REI.C.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.
(REI.C.6) Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.

(REI.C.7) Solve a simple system consisting of a linear equation and a quadratic equation in two variables algebraically and graphically.

(REI.C.8) Represent a system of linear equations as a single matrix equation in a vector variable.

(REI.C.9) Find the inverse of a matrix if it exists and use it to solve systems of linear equations (using technology for matrices of dimension 3×3 or greater).

Represent and solve equations and inequalities graphically.

(REI.D.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).

(REI.D.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.

(REI.D.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.

Instructional Methods and/or Strategies

- Direct instruction through lectures
- Group and class discussion
- Cooperative learning groups
- Hands-on experience and practice
- Project-based learning
- Online and video instruction

Assessment Methods and/or Tools

- Quizzes and unit tests
- Individual and Group projects
- On-going application assignments
- In-class participation and attendance