Mathematics
Algebra II: Academic
Unit 1: Linear Functions

Essential Understandings	▪ Linear functions can be used to model real-life situations.
Essential Questions	▪ What are the properties of Algebra and how are these used to solve linear equations? ▪ What types of data are modeled by linear equations? ▪ What are the properties of inequalities? ▪ How is slope calculated and what does it represent?
Essential Knowledge	▪ The associative, commutative, and distributive properties along with the addition and multiplication properties of equality are used to solve linear equations. ▪ Linear regression is used to find the line of best fit for various data sets. ▪ An inequality is a statement that compares two expressions by using symbols ▪ Multiplication or division by a negative number reverses the inequality. ▪ Slope is the ratio of the change in the dependent variable to the independent variable.
Vocabulary	▪ <u>Terms</u>: ○ associative, distributive, commutative properties ○ addition and multiplication properties of equalities and inequalities ○ linear function ○ slope, ratio and rate of change ○ Y-intercept, X-intercept ○ slope-intercept form of a linear equation ○ point-slope form of a linear equation ○ general or standard form of a linear equation ○ correlation and line of best fit ○ linear regression
Essential Skills	▪ Apply order of operation. ▪ Use properties of equalities and inequalities to write and solve linear equations. ▪ Graph linear equations and inequalities. ▪ Interpret the real world meaning to the slope and Y-intercept. ▪ Analyze and graph data using technology.

Mathematics
Algebra II: Academic
Unit 1: Linear Functions

Related Maine Learning Results	Mathematics A. Number Real Number A1. Students will know how to represent and use real numbers. a. Use the concept of nth root. b. Estimate the value(s) of roots and use technology to approximate them. c. Compute using laws of exponents. d. Multiply and divide numbers expressed in scientific notation. e. Understand that some quadratic equations do not have real solutions and that there exist other number systems to allow for solutions to these equations.

Mathematics
Algebra II: Academic
Unit 1: Linear Functions

Related Maine Learning Results	B. Data Measurement and Approximation B1. Students understand the relationship between precision and accuracy. a. Express answers to a reasonable degree of precision in the context of a given problem. b. Represent an approximate measurement using appropriate numbers of significant figures. c. Know that most measurements are approximations and explain why it is useful to take the mean of repeated measurements. Data Analysis B2. Students understand correlation and cause and effect. a. Recognize when correlation has been confused with cause and effect. b. Create and interpret scatter plots and estimate correlation and lines of best fit. c. Recognize positive and negative correlations based on data from a table or scatter plot. d. Estimate the strength of correlation based upon a scatter plot. B3. Students understand and know how to describe distributions and find and use descriptive statistics for a set of data. a. Find and apply range, quartiles, mean absolute deviation, and standard deviation (using technology) of a set of data. b. Interpret, give examples of, and describe key differences among different types of distributions: uniform, normal, and skewed. c. For the sample mean of normal distributions, use the standard deviation for a group of observations to establish 90%, 95%, or 99% confidence intervals. B4. Students understand that the purpose of random sampling is to reduce bias when creating a representative sample for a set of data. a. Describe and account for the difference between sample statistics and statistics describing the distribution of the entire population. b. Recognize that sample statistics produce estimates for the distribution of an entire population and recognize that larger sample sizes will produce more reliable estimates. c. Apply methods of creating random samples and recognize possible sources of bias in samples

Mathematics
Algebra II: Academic
Unit 1: Linear Functions

Related Maine Learning Results	D. Algebra Symbols and Expressions D1. Students understand and use polynomials and expressions with rational exponents. a. Simplify expressions including those with rational numbers. b. Add, subtract, and multiply polynomials. c. Factor the common term out of polynomial expressions. d. Divide polynomials by (ax+b).

Mathematics
Algebra II: Academic
Unit 1: Linear Functions

Related Maine Learning Results	Equations and Inequalities D2. Students solve families of equations and inequalities. a. Solve systems of linear equations and inequalities in two unknowns and interpret their graphs. b. Solve quadratic equations graphically, by factoring in cases where factoring is efficient, and by applying the quadratic formula. c. Solve simple rational equations. d. Solve absolute value equations and inequalities and interpret the results. e. Apply the understanding that the solution(s) to equations of the form f(x) = g(x) are x-value(s) of the point(s) of intersection of the graphs of f(x) and g(x) and common outputs in table of values. f. Explain why the coordinates of the point of intersection of the lines represented by a system of equations is its solution and apply this understanding to solving problems. D3. Students understand and apply ideas of logarithms. a. Use and interpret logarithmic scales. b. Solve equations in the form of $x + b^y$ using the equivalent form $y = \log_b x$. Functions and Relations D4. Students understand and interpret the characteristics of functions using graphs, tables, and algebraic techniques. a. Recognize the graphs and sketch graphs of the basic functions. b. Apply functions from these families to problem situations. c. Use concepts such as domain, range, zeros, intercepts, and maximum and minimum values. d. Use the concepts of average rate of change (table of values) and increasing and decreasing over intervals, and use these characteristics to compare functions. D5. Students express relationships recursively and use iterative methods to solve problems. a. Express the (n+1)st term in terms of the nth term and describe relationships in terms of starting point and rule followed to transform one terms to the next. b. Use technology to perform repeated calculations to develop solutions to real life problems involving linear, exponential, and other patterns of change.

Mathematics
Algebra II: Academic
Unit 1: Linear Functions

Sample Lessons And Activities	▪ Solve equations and inequalities with variables on both sides using properties of Algebra. Identity identities and contradictions. ▪ Use a data set to make a scatter plot, find the correlation coefficient and the line of best fit. ▪ Graph and determine the equation of a line using slope-intercept, point-slope and general form.
Sample Classroom Assessment Methods	▪ Evaluate homework. ▪ Quizzes. ▪ Chapter test.
Sample Resources	▪ <u>Publications:</u> o Holt Algebra 2 o McDougal Littell Algebra 2 ▪ <u>Other Resources:</u> o Graphing calculators o The A+ learning system for remediation