

Unit	Topic	Lesson	Lesson Objectives
Connecting Patterns and Functions			
Measurement and Proportions			
Ratios and Rates			
Determine unit rates.			
Write ratios as fractions in simplest form.			
Using Proportions			
Solve proportions.			
Use proportions to solve real-world problems.			
Converting Between Measurement Systems			
Use a conversion factor to convert measurements between systems			
Unit Analysis			
Apply rates to solve a problem			
Use proportions to solve problems			
Use unit or dimensional analysis to solve a problem			
Precision and Significant Digits			
Indicate the precision of a measurement			
Use significant digits.			
Expressions			
Use Variables to Represent Numbers			
Evaluate algebraic expressions by using the order of operations.			
Translate written phrases into algebraic expressions.			
Properties of Real Numbers			
Recognize the properties of real numbers			
Simplify Expressions			
Simplify algebraic expressions by combining like terms.			
Simplify expressions by removing grouping symbols.			
Zero and Negative Exponents			
Convert between scientific and standard notation			
Evaluate expressions with zero and negative exponents			
Simplify expressions with zero and negative exponents			
Multiply with Like Bases			
Simplify algebraic expressions using the multiplication property of exponents			
Simplify numeric expressions using the multiplication property of exponents			

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Divide with Like Bases

- Simplify algebraic expressions using the division property of exponents
- Simplify numeric expressions using the division property of exponents

A Quantity to a Power

- Simplify expressions by raising a product to a power
- Simplify expressions by raising a quotient to a power

Apply Laws of Exponents

- Simplify expressions using laws of exponents
- Solve real-world problems with laws of exponents

Functions**Relations and Functions**

- Determine if a relation is a function
- Determine the domain and range of a relation
- Represent relations as sets of ordered pairs, tables, mappings, and graphs

Function Notation

- Evaluate functions
- Identify the independent and dependent variables of a function

Function Operations

- Perform operations with functions

Graphing Linear Functions

- Find ordered pairs that are solutions of linear equations.
- Graph linear equations.

Graph Functions

- Draw graphs of functions
- Interpret graphs of functions

Graphing Linear Equations Using Intercepts

- Find the x- and y-intercepts of graphs.
- Graph linear equations using the x- and y-intercepts.

Graphing Nonlinear Functions

- Graph absolute value functions.
- Graph quadratic functions.

Represent Relationships**Find a Pattern in Sequences**

- Find patterns to complete sequences using function tables.

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Problem Solving: Write an Equation

Solve problems by writing equations.

Write Function Rules

Write function rules from given data or graphs

Write function rules to model real-world situations

Solving an Equation

Solve an equation numerically and graphically

Solve an equation using algebra techniques

Parent Functions

Associate a parent function with a given graph or data

Determine the domain and range of parent functions

Shifts of Functions

Determine how changes to the rule of a function correspond to the translation of its graph

Linear Functions**Linear Relationships****Standard Form of a Linear Equation**

Determine solutions of a linear equation given in standard form

Graph a linear equation given in standard form

Identify a linear equation in standard form

Use the properties of equality to write a linear equation in standard form

Slope

Calculate the slope of a line given two points

Determine if a line has a positive, negative, zero, or no slope

Graph a line given its slope and a point on the line

Relate slope to the rate of change

Average Rate of Change

Determine the average rate of change

Understand the use of delta notation

Slope-Intercept Form

Convert between the standard and slope-intercept forms of linear equations

Graph a line from a given equation

Identify the slope and y-intercept of a line from a given equation or graph

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Write Linear Equations**Write Equations in Slope-Intercept Form**

- Write the equation of a line given its graph
- Write the equation of a line given its slope and y-intercept
- Write the equation of a line given two points on the line

Point-Slope Form

- Write the equation of a line given its slope and a point on the line.

Parallel Lines

- Determine if lines are parallel from their given equations
- Write the equation of a line given the equation of another line to which it is parallel and a point on that line

Perpendicular Lines

- Determine if lines are perpendicular from their given equations
- Write the equation of a line given the equation of another line to which it is perpendicular and a point on that line

Equations of Lines

- Write linear equations in various forms and from a variety of given information

Modeling Linear Functions**Modeling Linear Functions****Mathematical Modeling**

- Develop a function model
- Identify a mathematical model
- Recognize patterns and trends between two variables using tables as models
- Solve problems using formulas as a model

Slope-Intercept Form

- Develop the slope-intercept model of an equation of a line
- Identify situations modeled by an equation
- Use intercepts of a graph
- Use the slope-intercept formula to determine intercepts

Scatterplots

- Determine the correlation in a relationship
- Write an equation for the line of best fit and use it to make predictions

Scatterplots

- Determine the reasonableness of a model and the goodness of fit.
- Use linear models to approximate data sets and make predictions.

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Data Distribution

- Determine measures of central tendency
- Organize data with frequency tables, dotplots, and histograms
- Recognize symmetric and skewed frequency distributions

Measures of Central Tendency

- Calculate measures of central tendency
- Determine the effects of variability on measures of central tendency

Variability

- Measure the variability of frequency distributions
- Read and understand box-and-whisker plots
- Use standard deviation to understand mean

Probability and Two-Way Tables

- Calculate conditional probabilities from data displayed in a two-way table
- Use a two-way table to determine if two events are independent

Linear Equations and Inequalities**One-Variable Equations****Addition and Multiplication Properties of Equality**

- Justify steps used to solve an equation
- Solve equations by using the addition property of equality
- Solve equations by using the multiplication property of equality

Two-Step Equations

- Apply properties to solve two-step equations
- Verify a solution for an equation

Equations with Like Terms

- Apply properties to solve equations with like terms
- Verify a solution for an equation

Equations with Variables on Both Sides

- Apply properties to solve equations with the variable on both sides
- Verify a solution for an equation

Equations as Mathematical Models

- Judge the reasonableness of a solution
- Represent and solve real-world situations with equations

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Multi-Step Equations**Solve Equations Using the Distributive Property**

- Apply the distributive property to solve equations
- Determine if an equation has 0, 1, or an infinite number of solutions
- Determine if equations are equivalent

Simplify and Solve Equations

- Solve multi-step equations
- Verify a solution of an equation

Translate and Solve Written Statements

- Solve equations translated from written statements
- Translate written statements into equations

Literal Equations

- Evaluate the unknown variable in a literal equation
- Solve literal equations for a specific variable

Model and Solve Problems with Multi-Step Equations

- Judge the reasonableness of a solution
- Solve real-world problems using multi-step equations

Break-Even Points

- Determine the break-even point of a linear system
- Interpret break-even points on a graph
- Solve a system of two linear equations

Inequalities**Properties of Inequality**

- Apply the addition and multiplication properties of inequality

Write and Solve Inequalities

- Graph the solution sets of inequalities
- Solve one-variable inequalities
- Translate written statements into inequalities

Two-Step Inequalities

- Graph the solution sets of inequalities
- Solve two-step inequalities in one variable

Multi-Step Inequalities

- Graph the solution sets of inequalities
- Solve multi-step inequalities in one variable

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			<p>Compound Inequalities</p> <ul style="list-style-type: none"> Graph the solution sets of compound inequalities Solve compound inequalities <p>Graph Linear Inequalities</p> <ul style="list-style-type: none"> Graph linear inequalities in two variables Model and solve real-world problems involving linear inequalities
			<p>Absolute Value Equations and Inequalities</p> <p>Absolute Value Equations in One Variable</p> <ul style="list-style-type: none"> Solve absolute value equations <p>Absolute Value Inequalities in One Variable</p> <ul style="list-style-type: none"> Solve and graph absolute value inequalities in one variable <p>Multi-Step Absolute Value Inequalities in One Variable</p> <ul style="list-style-type: none"> Solve and graph absolute value inequalities in one variable <p>Model and Solve Problems with Absolute Value Inequalities</p> <ul style="list-style-type: none"> Judge the reasonableness of a solution Model and solve real-world problems using absolute value inequalities
			<p>Linear Systems</p> <p>Linear Systems</p> <p>Solve a Linear System Graphically</p> <ul style="list-style-type: none"> Apply a system of equations to solve a one-variable linear equation graphically Determine if a linear system of equations is dependent, independent, consistent, or inconsistent Identify the graphical solution of a system of linear equations <p>Solve a Linear System by Substitution</p> <ul style="list-style-type: none"> Determine if a point is a solution of a linear system Solve a system of two linear equations in two variables using substitution <p>Solve a Linear System by Elimination</p> <ul style="list-style-type: none"> Determine if a point is a solution of a linear system Solve a system of two linear equations in two variables using elimination <p>Model and Solve Problems with Linear Systems</p> <ul style="list-style-type: none"> Use a system of linear equations to model and solve real-world problems <p>Systems of Linear Inequalities</p> <ul style="list-style-type: none"> Determine if a point is a solution of a system of linear inequalities Identify the graphical solution of a system of linear inequalities

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Sequences and Functions**Sequences and Functions****Arithmetic Sequences**

- Extend and find the n th term of an arithmetic sequence
- Recognize arithmetic sequences
- Write formulas for arithmetic sequences

Geometric Sequences

- Extend and find the n th term of a geometric sequence
- Recognize geometric sequences
- Write formulas for geometric sequences

Other Sequences

- Find patterns in sequences.

Recursive Formulas

- Extend and find the n th term of a recursively defined sequence

Growth and Decay Factors

- Apply growth and decay factors involving percents of increase and decrease
- Define growth and decay factors
- Determine growth and decay factors from percents of increase and decrease

Exponential Functions and Equations**Rational Exponents and Radicals****Laws of Exponents**

- Apply the properties of whole-number exponents to generate equivalent expressions.

Rational Exponents

- Simplify expressions with rational exponents

Simplify Radicals

- Express radicals in simplest form

Add and Subtract Radicals

- Simplify sums and differences involving radicals

Multiply Radicals

- Simplify products involving radicals

Divide Radicals

- Simplify quotients involving radicals

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Operations on Rational and Irrational Numbers

Explain why the product of a nonzero rational number and an irrational number is irrational.

Explain why the sum and product of two rational numbers are rational.

Explain why the sum of a rational number and an irrational number is irrational.

Exponential Functions and Equations**Exponential Growth and Decay**

Use tables, rules and graphs with functions modeling decay.

Use tables, rules, and graphs with functions modeling growth.

Exponential Functions

Evaluate exponential expressions

Graph exponential functions

Growth and Decay

Identify data that displays exponential behavior

Solve problems involving exponential growth and decay

Rewriting Exponential Functions

Use alternative forms of an exponential function to highlight different information about that function and the real-world situation it models.

Write exponential functions and expressions in equivalent forms, using the properties of exponents to justify steps.

Linear and Exponential Models**Linear and Exponential Models****Linear Functions**

Determine if a function is linear.

Represent a linear relationship numerically, algebraically, and graphically.

Linear Growth vs. Exponential Growth

Use tables and graphs to compare the growth of an exponential function vs. a linear function over equal intervals.

Use tables and graphs to show that exponential functions grow by equal factors over equal intervals.

Exponential Functions

Graph exponential functions from data and equations

Graph exponential functions from symbolic rules

Recognize an exponential function as a rule for apply growth or decay factors

Use Exponential Functions

Determine growth and decay factors for exponential functions represented by a table of values or an equation

Determine the doubling and halving time

Graph exponential functions defined by $y = abx$

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Population Growth

- Determine annual growth or decay rate of an exponential function represented by a table of values or an equation
- Graph an exponential function having equation $y = a(1 \pm r)^x$

Equations of Exponential Functions

- Determine the equation of an exponential function that best fits the given data
- Determine whether a linear or exponential model best fits given data
- Make predictions using an exponential regression equation

Quadratic Functions**Quadratic Functions****Quadratic Equations in Standard Form**

- Determine a parabola's line of symmetry, vertex, and whether it opens up or down
- Graph quadratic functions
- Recognize a quadratic function

Intercepts and Zeros

- Graph quadratic functions
- Use the zero product property to find the zeros of a function and relate to the intercepts of the graph
- Use the zeros of a quadratic function to find the vertex of the graph of the function

Quadratic Equations

- Explore the role of a , b and c as it relates to the graph of quadratic equation
- Identify functions of the form $y = ax^2+bx+c$ as quadratic functions

Parabolas

- Determine the axis of symmetry of a parabola
- Determine the intercepts of a parabola
- Determine the vertex of a parabola
- Identify the domain and range
- Interpret the meaning of the vertex and intercepts of a parabola

Quadratic Equations in Vertex Form

- Determine the effects on the graph by changing the values of a , h , and k in the vertex form of a quadratic function
- Write a quadratic equation for a given parabola

Convert Between Standard and Vertex Form

- Convert a quadratic equation from standard to vertex form

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Comparing Exponential, Linear, and Quadratic Growth

Use tables and graphs to compare the growth of an exponential function to the growth of a linear function over equal intervals.

Use tables and graphs to compare the growth of an exponential function to the growth of a quadratic or a polynomial function over equal intervals.

Use tables and graphs to show that exponential functions grow by equal factors over equal intervals.

Making Connections: Daredevil Danny

Polynomials

Polynomial Operations

Add and Subtract Polynomials

Add and subtract polynomials

Classify polynomials

Multiply and Divide by a Monomial

Multiply and divide polynomials by monomials

Multiply Polynomials

Multiply polynomials

Special Products

Identify special products of binomials

Divide Polynomials

Divide polynomials

Simplify Polynomial Expressions

Simplify polynomial expressions

Factoring Polynomials

The Greatest Common Factor

Determine the greatest common factor

Use the greatest common factor to factor polynomials

Factor by Grouping

Factor polynomials by grouping

Factor Trinomials with Leading Coefficient of One

Factor trinomials with a leading coefficient of one

Factor Trinomials with a Leading Coefficient Other than One

Factor trinomials with a leading coefficient other than one

Special Cases

Factor perfect square trinomials

Factor the difference of two squares

Unit	Topic	Lesson	Lesson Objectives
			Factoring Polynomials Apply various factoring methods to completely factor a polynomial
			Simplifying Polynomial Expressions Simplify expressions involving operations with polynomials.
			Quadratic Equations
			Quadratic Equations
			The Squaring and Square Root Properties Solve equations using the square root property of equality Solve equations using the squaring property of equality
			Solve by Factoring Solve quadratic equations by using the zero product property
			Complete the Square Solve quadratic equations by completing the square
			The Quadratic Formula Use the discriminant to determine the nature of the roots of a quadratic equation Use the quadratic formula to solve equations with rational roots
			Irrational Roots Use the quadratic formula to solve equations with irrational roots
			Model and Solve Problems with Quadratics Model and solve real-world problems using quadratic equations
			Model Problems with Quadratic Functions Model and solve real-world problems using quadratic functions Solve a system of two equation where one is quadratic