Unit	Topic	Lesson	Lesson Objectives

Problem Solving Models

Understanding Problems

Problem-Solving

Develop problem-solving skills

Organize information

Practice communication skills

Write a solution sentence

Patterns

Communicate problem-solving ideas

Develop problem-solving strategies

Organize information

Expressions and Formulas

Translate verbal sentences into expressions and equations

Use formulas to solve problems

Proportional Reasoning

Use proportional reasoning to solve problems

Write and solve a proportion

Unit Analysis

Apply rates to solve a problem

Use proportions to solve problems

Use unit or dimensional analysis to solve a problem

Functions and Graphs

Understand Functions

Identify functional relationships between two variables

Identify input and output involving two variable quantities

Identify trends in data numerically and graphically

Represent functions between two variables using tables and graphs

Domain and Range

Determine the domain and range of a function

Identify the independent and dependent variables of a function

Write the equation to define a function

Unit	Topic	Lesson	Lesson Objectives

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

Solving an Equation

Solve an equation numerically and graphically

Solve an equation using algebra techniques

Write and Solve Equations

Develop models to solve problems

Solve equations with variables on both sides

Solve formulas for a specified variable

Use the distributive property

Reading Graphs

Describe graphs in words

Identify increasing, decreasing and constant parts of graphs

Identify maximum and minimum of a graph

Sketch a graph to represent a situation

Graphical and Statistical Models

Data Analysis

Misleading Graphs

Recognize scaling of axes on graphs

Scaling axes of graphs

Bar and Circle Graphs

Read and interpret bar graphs

Read and interpret circle graphs

Read tables

Scatterplots

Construct scatterplots

Estimate and draw a best fit line

Estimate errors of line of best fit

Unit	Topic	Lesson	Lesson Objectives

Organizing Data

Collect and organize data

Plot data in a scatterplot

Recognize linear patterns in data

Data Distribution

Determine measures of central tendency

Organize data with frequency tables, dotplots, and histograms

Recognize symmetric and skewed frequency distributions

Variability

Measure the variability of frequency distributions

Read and understand box-and-whisker plots

Use standard deviation to understand mean

Probability and Counting Methods

Probability

Determine relative frequency for a set of data

Determine theoretical and experimental probability

Simulate an experiment

Understand properties of probability

Sample Space

Apply the multiplication principle of counting

Determine the sample space for a probability distribution

Display a sample space with a tree diagram

Permutations and Combinations

Determine the number of combinations

Determine the number of permutations

Binomial Probability

Calculate binomial probabilities

Recognize components of binomial experiments

Function Models

Linear Equations

Average Rate of Change

Determine the average rate of change

Understand the use of delta notation

Unit	Topic	Lesson	Lesson Objectives

Slope

Determine slope of a line between two points

Identify increasing and decreasing linear functions using slope

Identify linear functions by a constant rate of change

Interpret slope as an average rate of change

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

Write Linear Equations using Slope & y-Intercepts

Interpret slopes and y-intercepts

Write an equation for a linear function given its slope and y-intercept

Write linear functions in slope-intercept form

Write Linear Equations using Two Points

Determine the equation using two points

Determine the slope and y-intercept using equations and graphs

Interpret slopes and y-intercepts

Systems of Equations

Interpret the solution to a system of equations

Solve a system of two linear equations

Use the substitution method to solve systems of 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 and Quadratics

Linear Inequalities

Solve compound inequalities

Solve linear inequalities numerically and graphically

Use properties of inequalities to solve inequalities

Unit	Topic	Lesson	Lesson Objectives

Quadratic Functions

    Evaluate functions of the form $y = ax^2$

    Graph functions of the form $y = ax^2$

    Interpret the coordinates of points on the graph $y = ax^2$

    Solve an equation of the form $ax^2 = c$ using square roots

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

Solving Quadratic Equations

    Solve quadratic equations graphically

    Solve quadratic equations numerically

The Quadratic Formula

    Identify solutions of quadratic equations using a graph

    Use the quadratic formula to solve quadratic equations

Quadratic Regression Models

    Determine quadratic regressions models

    Solve problems using quadratic regressions models

Financial Models

    Personal Finance

Personal Finances

    Solve problems involving personal finances

Interest

    Apply the compound interest formula to determine future values of a lump sum investment

    Apply the present value formula

    Determine effective interest rate

    Distinguish between simple and compound interest

Unit	Topic	Lesson	Lesson Objectives

Annuities

    Determine future and present values using technology

    Determine the future value of an ordinary annuity using a formula

    Determine the present value of an ordinary annuity

    Distinguish between an ordinary and an annuity due

    Solving problems involving annuities

Amortization

    Determine the amortization payment of a loan using technology

    Determine the amortization payment on a loan using a formula

    Solve problems involving repaying a loan or liquidating a sum of money by amortization model

    Use technology to determine past and present values of annuities

Future Planning Finance

Installment Loans

    Determine an installment payment

    Determine annual percentage rate (APR) using the APR formula and using a table

    Determine interest on a credit card using average daily balance

    Determine the amount financed, installment price and finance charges of an installment loan

    Determine unearned interest on a loan if prepayment

Mortgages

    Determine if borrowers qualify for a mortgage

    Determine monthly mortgage payments using a table

    Determine the amount of a down payment and points in a mortgage

    Determine total interest on mortgages

    Prepare a partial amortization schedule of a mortgage

Life Insurance

    Calculate the value of each of the nonforfeiture options for a cancelled permanent life insurance policy

    Determine the annual life insurance premium for different types of policies using a table

    Distinguish between term and permanent life insurance

Stocks and Bonds

    Calculate the price of bonds

    Distinguish between a stock and a bond

    Read stock and bond listings

    Solve problems involving stocks and bonds

Unit	Topic	Lesson	Lesson Objectives

Exponential, Trigonometric and Variation Models

Exponential Functions

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

Consecutive Growth and Decay Factors

Apply consecutive growth and or decay factors involving percent changes

Define consecutive growth and decay factors

Determine a consecutive growth or decay factor from consecutive percent changes

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 $y = abx$

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 $y = a(1 \pm r)2$

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

Trigonometric Functions

Right Triangles

Determine the sine, cosine, and tangent of an acute angle by using technology

Determine the sine, cosine, and tangent of an angle using right triangles

Identify sides and corresponding angles of a right triangle

Use proportions to determine side lengths of similar right triangles

Angle Relationships

Demonstrate that the sine and cosine of complementary angles are equal

Identify complementary angles

Unit	Topic	Lesson	Lesson Objectives

Inverse Functions

Determine the inverse sine and cosine of a number using technology

Determine the inverse tangent of a number

The Sine Function

Determine the equation of a sine function that best fits given data

Make predictions using a sine regression equation

The Unit Circle

Determine the coordinates of points on a unit circle using sine and cosine functions

Identify the properties of the graphs of sine and cosine functions

Sketch a graph of y = sin x and y = cos x

Degree and Radian Measures

Convert between degree and radian measures

Identify the period and frequency of a function defined by y = a sin(bx) or y = a cos(bx) using the graph

Amplitude and Period

Determine the amplitude of the graph of y = a sin(bx) and y = a cos(bx) using a formula

Determine the period of the graph of y = a sin(bx) and y = a cos(bx) using a formula

Wavelength and Frequency

Determine the sine model for a given frequency

Know the relationship between wavelength and frequency

Variation of Functions

Direct Variation

Determine the constant of proportionality in a direct variation problem

Recognize equivalent forms of the direct variation statement

Solve direct variation problems

Inverse Variation

Graph an inverse variation relationship

Recognize equations of the form xy = k as inverse variations

Recognize functions of the form y = k/x as nonlinear

Solve equations of the form a/x = b

Constant of Variation

Describe the properties of graphs having the equation y = k/x

Determine the constant of variation

Graph an inverse variation function defined by an equation of the form y = k/x

Unit	Topic	Lesson	Lesson Objectives

Geometric Models

    Plane Figures

        Perimeter

            Recognize perimeter as a geometric property of plane figures

            Use unit analysis to solve problems involving perimeter

            Write and use formulas for circumference

            Write formulas for and calculate perimeters of plane figures

        Perimeter of Composite Figures

            Calculate perimeters of many-sided plane figures using combinations of formulas

            Use unit analysis to solve problems involving perimeters

        Area

            Calculate areas of polygons using formulas

            Determine the area of a circle by formula

            Write formulas for areas of polygons

        Area and Perimeter in Context

            Distinguish between problems requiring area and perimeter formulas

            Solve problems in context using geometric models

        Tessellations

            Identify a tessellation

            Identify reflective and translational symmetry

            Perform a glide reflection on a given figure

            Perform a transformation on a given figure

            Reflect, translate and rotate a given figure

        Similar Triangles

            Recognize geometric properties of similar triangles

            Use similar triangles in indirect measurement

        Relationships in Figures

            Recognize a golden rectangle by finding the golden ratio

            Recognize Fibonacci numbers and the limit of the ratio of successive Fibonacci numbers

            Understand Desargue's Theorem

            Understand one- and two-point perspective

Unit	Topic	Lesson	Lesson Objectives

Three-Dimensional Figures

Surface Area

Recognize properties of three-dimensional figures

Write formulas for and calculate surface area of three-dimensional figures

Volume of Prisms and Cylinders

Recognize geometric properties of three-dimensional figures

Write formulas for and calculate volumes of prisms and cylinders

Volume of Spheres and Cones

Write formulas for and calculate volumes of spheres and cones

Scale Drawings

Use geometry formulas to solve problems

Use scale drawings in the problem-solving process