

Math 6A

SCOPE OF COURSE

This course is divided into two semesters of study (A & B) comprised of five units each. The first-semester (A) is a study of whole numbers and integers; rational numbers; statistics; probability and measurement; and geometric figures.

SEQUENCE OF SKILLS

UNIT 1 – Whole Numbers and Integers

Working with Place Value

- Learn to read and write whole numbers to the trillions place

Integers and Absolute Value

- Understand what the set of integers is
- Place integers on the number line
- Find the absolute value of an integer

Addition and Subtraction with Integers

- Represent integer addition and subtraction on a number line and with “integer chips”
- Algebraically add and subtract positive and negative integers

Multiplication with Integers

- Represent integer multiplication with integer chips
- Algebraically multiply positive and negative integers

Dividing Integers

- Understand the concept of division
- Algebraically perform division of positive and negative integers

Exponents

- Understand the concept of exponents as repeated multiplication
- Evaluate integers with exponents of powers one, two, and three

Order of Operations

- Understand the importance of defining a particular order of math operations
- Use the correct order of operations in arithmetic expressions
- Begin to understand fractions as division

Properties of Addition and Multiplication

- Define and apply the commutative and associative properties of addition and multiplication
- Define and apply the distributive property of multiplication over addition

Special Properties

- Define and apply the inverse properties
- Define and apply the properties of zero

Prime Factorization

- Understand that any whole number can be written as a product of its prime factors
- Express a given whole number as a product of its prime factors, using exponents

The Least Common Multiple (LCM)

- Find the least common multiple of two numbers

The Greatest Common Factor (GCF)

- Find the greatest common factor of two numbers

Estimation and Mental Math

- Understand rounding to a place value
- Estimate multiplying large numbers by rounding to the tens place and hundreds place

Review and Problem Solving

- Solve applications involving algebraic properties and different whole number operations

Math 6A

SEQUENCE OF SKILLS

UNIT 2 – Rational Numbers

Rational Numbers: Fractions

- Understand fractions as rational numbers, and the meaning behind fraction notation
- Express relationships between fractions using equality and inequality symbols
- Use number sense to order fractions

Equivalent Fractions

- Understand the concept of equivalent fractions
- Be able to recognize equivalent fractions
- Express fractions in lowest terms

Addition and Subtraction with Fractions

- Understand the concept of adding and subtracting fractions
- Be able to add and subtract fractions with like and unlike denominators

Multiplication and Division with Fractions

- Understand the concept of multiplying and dividing fractions
- Understand division as the inverse of multiplication

Mixed Numbers

- Understand the relationship between fractions and mixed numbers
- Be able to convert between mixed numbers and improper fractions
- Order mixed numbers and fractions

Adding and Subtracting Mixed Numbers

- Understand the concept of addition and subtraction of mixed numbers
- Further understand whether to use a mixed number or improper fraction in any given situation

Multiplying and Dividing Mixed Numbers

- Understand the concept of multiplication and division of mixed numbers
- Be able to multiply and divide mixed numbers
- Further understand when to express in mixed number or as complex fraction form

Decimals

- Understand conceptually what decimal notation means
- Be able to convert from decimals to mixed numbers and fractions
- Order decimals, fractions, and mixed numbers

Converting Fractions to Decimals

- Understand how to represent fractions as terminating or repeating decimals
- Understand how to round decimals to given place values

Adding and Subtracting Decimals

- Understand decimal addition and subtraction
- Perform decimal addition and subtraction

Multiplying and Dividing Decimals

- Understand decimal multiplication and division
- Perform decimal multiplication and division

Scientific Notation

- Understand the concept of scientific notation
- Convert large whole numbers into scientific notation

Percentage

- Convert between decimals and percents
- Solve problems involving percents

Review and Problem Solving

- Solve applications involving rational numbers and scientific notation

Math 6A

SEQUENCE OF SKILLS

UNIT 3 – Statistics

Collecting Data

- Collect and organize data in a proper manner

Pie Graphs

- Interpret and read pie graphs
- Understand when pie graphs are used

Organizing Information: Frequency Tables

- Use tally to count frequency of data
- Organize data using a frequency table
- Interpret frequency tables
- Understand the concept of line plots

Stem-and-Leaf plots

- Create Stem-and-Leaf plots
- Interpret Stem-and-Leaf plots

Bar Graphs

- Use data to make bar graphs
- Interpret bar graphs

Pictographs

- Use data to make a pictograph
- Interpret pictographs

Histograms

- Use data to make a histogram
- Interpret histograms

Range, Mode, Mean, and Median

- Analyze data sets by finding the mean, median, mode, and range

Box-and-Whisker Plots

- Construct box-and-whisker plots
- Interpret box-and-whisker plots

Graphing Coordinates

- Plot points on a set of axes
- Identify coordinates of a point on the axes

Line Graphs

- Connect plotting points to data measurements
- Construct and interpret line graphs

Scatter Plots

- Plot points for scatter plots
- Determine the best fit line for a scatter plot

Using the Appropriate Data Display

- Understand when to use the correct graph
- Develop an understanding of how statistics can be misleading

Review and Problem Solving

- Solve applications involving different data displays
- Solve word problems with mean median and mode

Math 6A

SEQUENCE OF SKILLS

UNIT 4 – Probability and Measurement

Sets and Sample Spaces

- Understand the concept of Sets and Sample Spaces
- Use the Venn diagram model for sets

Theoretical Probability: Simple Experiments

- Find the theoretical probability of simple experiments
- Begin to develop an understanding of theoretical versus experimental probability

Tree Diagrams

- Use tree diagrams to find the possible outcomes of an experiment
- Use tree diagrams to find the theoretical probability of an outcome

Compound Probabilities

- Understand how to find the probability of two or more independent events

This then That: Dependent Events

- Find the probability of dependent events

A Deck of Cards and Dice

- Understand the suits and numbers in a standard deck of cards
- Understand basic probability in a standard deck of cards
- Understand the probability of the sum of two dice

Theoretical vs. Experimental Probability

- Understand the difference between theoretical and experimental probability
- Create probability experiments and compare data to theoretical probability

Standard Measurement

- Identify customary units of length, capacity, and weight
- Develop personal references for each unit
- Convert between customary units

Metric Units

- Convert between different metric units
- Understand metric units and what they represent

Tools of Measurement

- Understand when and how to use appropriate tools of measurement

Units of Time

- Understand the different units for time
- Convert between seconds, minutes, hours, days, weeks, and years
- Read a clock

Introduction to Angles

- Understand what an angle is
- Measure angles with a protractor

Operations with Measurements

- Add, subtract, and multiply with units of measurement

Review and Problem Solving

- Solve word problems involving probability
- Solve word problems involving measurement

Math 6A

SEQUENCE OF SKILLS

UNIT 5 – Geometric Figures

Classifying Angles

- Understand the concept of angles and the different classifications of angles
- Identify the type of angle based on its measurement
- Understand and identify parallel and perpendicular lines

Properties of Parallel Lines

- Understand properties of parallel lines being cut by a transversal line

Quadrilaterals

- Understand what a quadrilateral is
- Distinguish between different types of quadrilaterals

Area and Perimeter of Quadrilaterals

- Understand the concepts of area and perimeter
- Begin to develop the concept of an unknown variable
- Derive formulas for, and be able to compute area and perimeter of a square, rectangle, and parallelogram

Triangles

- Understand what a triangle is
- Distinguish between different types of triangles

Area of Triangles

- Understand how to find the perimeter of different types of triangles
- Understand how to find the area of different types of triangles

Regular and Irregular Polygons

- Distinguish between different types of polygons
- Understand the concept of a regular polygon

Area and Perimeter of Polygons

- Find the perimeter of regular and irregular polygons
- Find the area of regular and irregular polygons

Congruent and Similar Polygons

- Determine which polygons are congruent
- Determine which polygons are similar

Introduction to Circles

- Understand the concepts of radius and diameter
- Determine the circumference of a circle

Circumference and Area

- Determine the area of a circle based on the diameter and radius
- Determine the circumference of a circle based on the diameter and radius

3-Dimensional Shapes

- Classify different 3-dimensional solids
- Understand the parts that make a 3-dimensional solid

Volume and Surface Area

- Determine the Volume of various solids
- Determine the Surface Area of various solids

Review and Problem Solving

- Solve word problems involving area, circumference, and perimeter
- Solve word problems involving volume and surface area
- Develop problem solving skills by drawing pictures

Math 6B

SCOPE OF COURSE

Math 6B is the second and final semester of Math 6. This semester is a study of algebra and transformational geometry, as well as a review of previous concepts, and an application of them in real-world careers. Algebra is studied through equation solving, rates, ratios and proportions. Transformational geometry is presented through rigid motions and dilations. Math 6B also presents a spiraled curriculum, reviewing and emphasizing previously taught concepts in a fresh, concise way. Concepts are also applied in a real-world setting through an investigation of the presence of math skills within a broad spectrum of careers.

SEQUENCE OF SKILLS

UNIT 1 – An Intro to Algebra

Variables and Substitution

- Understand that letters can be used to represent numbers
- Simplify a given value to simplify an algebraic expression

More Substitution

- Substitute for two or more variables in an expression
- Substitute for multiply variables to verify the equality of two expressions

Polynomials

- Recognize monomials and polynomials
- Write polynomials in descending order

Translating Words to Algebraic Expressions

- Translate word phrases into algebraic expressions
- Solve word problems by translating sentences into algebraic expressions

Adding and Subtracting Polynomials

- Simplify polynomials by combining like terms
- Add and subtract polynomials

Properties of Equality

- Determine whether quantities are equal
- Begin solving equations using rules of equality

Solving Equations: Part One

- Given an equation, solve for a variable
- Check answer using substitution

Solving Equations: Part Two

- Perform more than one operation to solve for a variable
- Check answer using substitution

Translating Sentences into Algebraic Equations

- Translate a sentence into an algebraic equation, solve for an unknown, and check using substitution

Solving Inequalities: Part One

- Determine what an inequality is
- Solve inequalities using steps for equations
- Solve inequalities with variables on both sides of the inequality sign

Solving Inequalities: Part Two

- Solve inequalities involving negative numbers

Graphing Inequalities on a Number Line

- Graph inequalities on a number line using the method of testing values
- Solve and graph the solution of an inequality

Translating Inequalities

- Translate sentences into algebraic inequalities
- Solve inequality word problems by translating them into algebraic inequalities and graphing

Problem Solving and Review

- Solve word problems using algebraic equations
- Solve word problems using algebraic inequalities

Math 6B

SEQUENCE OF SKILLS

UNIT 2 – Using Algebra as a Tool

Square Roots

- Understand the concept of a square root
- Find the square root of a given perfect square

Ratios

- Understand ratios as a comparison of two or more numbers
- Use knowledge of equivalent fractions to write equal ratios

Rates

- Understand rates, unit rates, and equivalent rates
- Use unit rates to compare rates

Rates with Different Units

- Find equal rates with different units
- Solve rate word problems involving unit conversion

Introduction to Proportions

- Understand what a proportion is
- Find missing values in a proportion using equivalent fractions
- Solve word problems using proportional thinking

Proportions: Map Scales

- Use a ruler to measure lengths on a map
- Use proportions to find actual distances between points on a map
- Given one distance or length, measure and solve for an unknown

Proportions: Similar Triangles

- Understand the concept of similar triangles
- Use proportions to find one missing side in a pair of similar triangles

Proportions: Scale Drawings

- Use proportions to find dimensions in scale models
- Use proportional thinking to find the actual dimensions of objects

Proportions: Percents

- Use proportions to solve percent problems

Number Patterns and Sequences

- Use a table to complete a sequence of numbers
- Create a rule to finding numbers in a sequence
- Create a sequence based on a list of rules

Exploring Visual Patterns

- Use a table to continue a pattern
- Analyze a table to create a rule for finding any step of a pattern

Functions

- Understand functions and begin to understand their properties
- Given a function, generate a sequence using an input-output table
- Given an input-output table, generate a function

Graphing from Tables

- Use a table to plot points
- Graph a linear function by creating a table of values

Problem Solving & Review

- Solve word problems involving rates and proportions
- Solve problems involving sequences and functions

Math 6B

SEQUENCE OF SKILLS

UNIT 3 – Coordinate and Transformational Geometry

Geometry Review

- Review properties of basic shapes
- Classify basic shapes

Area of Irregular Polygons

- Find the area of irregular polygons on the coordinate plane

Geometric Translations

- Translate shapes on the coordinate plane
- Identify the translation based on the coordinates of two shapes

Reflections

- Reflect polygons over a given line in the plane
- Develop rules for reflecting over the x - and y -axes, and for the line $y = x$

Rotations

- Determine the angle of rotation given a pre-image and image
- Develop a rule for rotating in multiples of 90°

Dilations

- Dilate shapes on the coordinate plane
- Find the scale factor of the image and pre-image of a dilated figure

Which Transformation Is It?

- Analyze a pre-image and image to find out which transformation has taken place

Symmetry

- Determine whether shapes have a line of symmetry
- Find the number of lines of symmetry a polygon has

Combining Transformations

- Understand a glide reflection as a unique isometry
- Combine any two transformations

Tessellations

- Understand the concept of a tessellation
- Determine which shapes tessellate the plane

Drawing 3-D Solids

- Practice drawing different types of solids
- Draw solids from different viewpoints

Perspective Drawing

- Understand the concept of a vanishing point
- Use dilations to draw with perspective
- Find the vanishing point in a perspective drawing

Vertex-Edge Graphs

- Understand the meaning of vertex-edge graphs
- Recognize when a vertex-edge graph is transversable

Problem Solving & Review

- Solve basic transformational geometry questions
- Relate transformations to drawing
- Use vertex-edge graphs to solve map problems

Math 6B

SEQUENCE OF SKILLS

UNIT 4 – Review of Math 6A & 6B

Operations and Exponents

- Review basic integer operations
- Review basic operation properties
- Review exponents

Fractions

- Review of the concept of a fraction
- Add, subtract, multiply, and divide fractions

Mixed numbers

- Review the concept of a mixed number
- Add, subtract, multiply, and divide mixed numbers

Decimals

- Review the concept of a decimal
- Add subtract, multiply, and divide decimals

Range, Mode, Mean, and Median

- Find the range, mode, mean, and median of a set of numbers

Reading Graphs

- Analyze graphs to answer word problems

Probability

- Review the concept of theoretical and experimental probability
- Determine the theoretical probability for simple and compound events

Converting Units

- Review conversion factors within customary and metric measure
- Convert units within the customary and metric unit systems

Perimeter and Area

- Find the perimeters of polygons and the circumference of circles
- Find the area of rectangles, triangles, and circles

Transformational Geometry

- Translate, rotate, reflect, and dilate different geometric figures
- Determine if a figure has been translated, rotated, reflected or dilated

Solving Equations

- Solve one-and two-step equations for a single variable
- Check answers using substitution

Functions and Patterns

- Create a function based on a sequence given
- Given a function, create a sequence using an input-output table
- Create a graph for a given function

Proportions

- Review the concept of a proportion
- Find missing values in a proportion using the cross product
- Review the various applications of proportions

Problem Solving Strategies

- Understand the 4-step problem-solving method
- Use the 4-step problem-solving method to solve a problem

Math 6B

SEQUENCE OF SKILLS

UNIT 5 – Math in Careers

Retailer

- Make change using subtraction and addition
- Compute sales prices using percents
- Compute sales tax using percents

Business Owner

- Understand the concepts of profit, cost, and revenue
- Use formulas to calculate revenue and profit

Banker

- Understand the benefits of savings accounts
- Use a formula to calculate simple interest

Chef / Baker

- Work with converting units in baking and cooking

Sports Coach

- Use the mean and percents to examine sports statistics
- Use data to determine sports statistics

Event Planner

- Use information to create a budget for an event

Paleontologist

- Understand the concept of half-life
- Solve word problems involving half-lives

Dietitian

- Understand the basic function of cholesterol in the body
- Use formulas to calculate cholesterol and heart-attack-risk ratio
- Use a table to interpret results from formulas

Contractor

- Use tables to analyze the cost of different types of flooring
- Calculate the area of irregular polygons
- Measure objects using a ruler to solve scale drawing problems

Musician

- Use fractions to understand the beats within music
- Use fractions and number sense to understand pitch frequency

Farmer

- Use area to determine how much a crop produces
- Use rates to calculate expenses, revenue, and profit

Painter

- Use ratios and algebra to determine the proper amounts of paint

Police Officer

- Use given information to calculate average speed
- Use proportions to calculate minimum time
- Convert units to measure miles per hour

Rocket Scientist

- Use substitution for formulas related to trajectory
- Solve for a variable in formulas related to trajectory