

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

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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

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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

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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

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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