

## Minnesota Academic Standards Mathematics 6-12

### **Gr. 6 *Number & Operation***

- Read, write, represent and compare positive rational numbers expressed as fractions, decimals, percents and ratios; write positive integers as products of factors; use these representations in real-world and mathematical situations.
- Understand the concept of ratio and its relationship to fractions and to the multiplication and division of whole numbers. Use ratios to solve real-world and mathematical problems.
- Multiply and divide decimals, fractions and mixed numbers; solve real-world and mathematical problems using arithmetic with positive rational numbers.

### ***Algebra***

- Recognize and represent relationships between varying qualities; translate from one representation to another; use patterns, tables, graphs and rules to solve real-world and mathematical problems.
- Use properties of arithmetic to generate equivalent numerical expressions and evaluate expressions involving positive rational numbers.
- Understand and interpret equations and inequalities involving variables and positive rational numbers. Use equations and inequalities to represent real-world and mathematical problems; use the idea of maintain equality to solve equations. Interpret solutions in the original context.

### ***Geometry & Measurement***

- Calculate perimeter, area, surface area and volume of two- and three-dimensional figures to solve real-world and mathematical problems.
- Understand and use relationships between angles in geometric figures.
- Choose appropriate units of measurement and use ratios to convert within measurement systems to solve real-world and mathematical problems.

### ***Data Analysis & Probability***

- Use probabilities to solve real-world and mathematical problems; represent probabilities using fractions, decimals and percents.

### **Gr. 7 *Number & Operation***

- Read, write, represent and compare positive and negative rational numbers, expressed as integers, fractions and decimals.

- Calculate with positive and negative rational numbers, and rational numbers with whole number exponents, to solve real-world and mathematical problems.

### ***Algebra***

- Understand the concept of proportionality in real-world and mathematical situations, and distinguish between proportional and other relationships.
- Recognize proportional relationships in real-world and mathematical situations; represent these and other relationships with tables, verbal descriptions, symbols and graphs; solve problems involving proportional relationships and explain results in the original context.
- Apply understanding of order of operations and algebraic properties to generate equivalent numerical and algebraic expressions containing positive and negative rational numbers and grouping symbols, evaluate such expressions.
- Represent real-world and mathematical situations using equations with variables. Solve equations symbolically, using properties of equality. Also solve equations graphically and numerically. Interpret solutions in the original context.

### ***Geometry & Measurement***

- Use reasoning with proportions and ratios to determine measurements, justify formulas and solve real-world and mathematical problems involving circles and related geometric figures.
- Analyze the effect of change of scale, translations and reflections on the attributes of two-dimensional figures.

### ***Data Analysis & Probability***

- Use mean, median and range to draw conclusions about data and make predictions.
- Display and interpret data in a variety of ways, including circle graphs and histograms.
- Calculate probabilities and reason about probabilities using proportions to solve real-world and mathematical problems.

## **Gr. 8 *Number & Operation***

- Read, write, compare, classify and represent real numbers, and use them to solve problems in various contexts.

### ***Algebra***

- Understand the concept of function in real-world and mathematical situations, and distinguish between linear and nonlinear functions.
- Recognize linear functions in real-world and mathematical situations; represent linear functions and other functions with tables, verbal descriptions, symbols and graphs; solve problems involving these functions and explain results in the original context.

- Generate equivalent numerical and algebraic expressions and use algebraic properties to evaluate expressions.
- Represent real-world and mathematical situations using equations and inequalities involving linear expressions. Solve equations and inequalities symbolically and graphically. Interpret solutions in the original context.

***Geometry & Measurement***

- Solve problems involving right triangles using the Pythagorean Theorem and its converse
- Solve problems involving parallel and perpendicular lines on a coordinate system.

***Data Analysis & Probability***

- Interpret data using scatterplots and approximate lines of best fit. Use lines of best fit to draw conclusions about data.

**Gr. 9, 10, 11**

***Algebra***

- Understand the concept of function, and identify important features of functions and other relations using symbolic and graphical methods where appropriate.
- Recognize linear, quadratic, exponential and other common functions in real-world and mathematical situations; represent these functions with tables, verbal descriptions, symbols and graphs; solve problems involving these functions, and explain results in the original context.
- Generate equivalent algebraic expressions involving polynomials and radicals; use algebraic properties to evaluate expressions.
- Represent real-world and mathematical situations using equations and inequalities involving linear, quadratic, exponential and nth root functions. Solve equations and inequalities symbolically and graphically. Interpret solutions in the original context.

***Geometry & Measurement***

- Calculate measurements of plane and solid geometric figures; know that physical measurements depend on the choice of a unit and that they are approximations.
- Construct logical arguments, based on axioms, definitions and theorems, to prove theorems and other results in geometry.
- Know and apply properties of geometric figures to solve real-world and mathematical problems and to logically justify results in geometry.
- Solve real-world and mathematical geometric problems using algebraic methods.

***Data Analysis & Probability***

- Display and analyze data; use various measures associated with data to draw conclusions, identify trends and describe relationships.
- Explain the uses of data and statistical thinking to draw inferences, make predictions and justify conclusions.

- Calculate probabilities and apply probability concepts to solve real-world and mathematical problems