Washington Mathematics

Grade 6

Standards for Mathematical Practice

1 **Make sense of problems and persevere in solving them.** 1

2 **Reason abstractly and quantitatively.** 2

3 **Construct viable arguments and critique the reasoning of others.** 3

4 **Model with mathematics.** 4

5 **Use appropriate tools strategically.** 5

6 **Attend to precision.** 6

7 **Look for and make use of structure.** 7

8 **Look for and express regularity in repeated reasoning.** 8

Ratios and Proportional Relationships

A **Understand ratio concepts and use ratio reasoning to solve problems**

1 Explain the concept of a ratio and flexibly, efficiently, and accurately use ratio language to describe a ratio relationship between two quantities. 6.RP.A.1

2 Understand the concept of a unit rate $aaaa$ associated with a ratio $aa{:}bb$ with $bb \neq 0$, and use rate language in the context of a ratio relationship. 6.RP.A.2

3 Flexibly, efficiently, and accurately demonstrate ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations to find different ways to express the same ratio. This includes working with unit rates (like price per item) and percents (a special ratio out of 100) and using ratios to convert between different measurement units, like inches to feet. 6.RP.A.3

The Number System

A **Apply and extend previous understandings of multiplication and division to divide fractions by fractions.**

1 Interpret and flexibly, efficiently, and accurately determine quotients of fractions, and solve word problems involving division of fractions by fractions, e.g., by using visual fraction models and equations to represent the problem. 6.NS.A.1

B **Compute flexibly, accurately, and efficiently with multi-digit numbers and find common factors and multiples.**

2 Flexibly, efficiently, and accurately divide multi-digit numbers using strategies or algorithms. 6.NS.B.2

3 Flexibly, efficiently, and accurately add, subtract, multiply, and divide multi-digit decimals using strategies or algorithms for each operation. 6.NS.B.3

4 Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two whole numbers less than or equal to 12. Use the distributive property to express a sum of two whole numbers 1–100 with a common factor as a multiple of a sum of two whole numbers with no common factor. 6.NS.B.4

C **Apply and extend previous understandings of numbers to the system of rational numbers.**

5 Explain how positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge); use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation. 6.NS.C.5

6 Understand a rational number as a point on the number line. Extend number line diagrams and coordinate axes familiar from previous grades to place any number (integer or rational, positive or negative) on the line (horizontal or vertical) and understand the opposite of the opposite of a number is the distance between that number and zero [-(-3)= 3]. Understand the grid uses two numbers to find any spot, just like a map! 6.NS.C.6

7 Understand ordering and absolute value of positive and negative rational numbers and integers using inequalities to write, interpret, and explain which number is bigger or smaller on a number line. Use absolute value to demonstrate how far a number is from zero. Apply comparisons in real world contexts like absolute distance on a map, comparing temperatures, or understanding the size of a debt. 6.NS.C.7

8 Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane. Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate. 6.NS.C.8

Expression and Equations

A Apply and extend previous understandings of arithmetic to algebraic expressions.

1. Flexibly, efficiently, and accurately write and evaluate numerical expressions involving whole-number exponents. 6.EE.A.1
2. Read, and evaluate expressions flexibly, efficiently, and accurately in which letters stand for numbers to write general instructions like "subtract y from 5" as a mathematical expression (5 - y). They'll also be able to break down more complex expressions into their parts (terms, factors) and understand the order of operations. Finally, they'll practice plugging specific values for the variables (evaluating the expression) to solve problems. This can involve using real-world formulas, like finding the volume of a box using a variable for the side length. 6.EE.A.2
3. Apply the properties of operations flexibly, efficiently, and accurately to generate equivalent expressions including the distributive property. 6.EE.A.3
4. Identify when two expressions are equivalent as both expressions will always yield the same outcome for any value of the variable. 6.EE.A.4

B Reason about and solve one-variable equations and inequalities.

5. Understand solving an equation or inequality as a process of answering a question: which values from a specified set, if any, make the equation or inequality true? Use substitution to determine whether a given number in a specified set makes an equation or inequality true. 6.EE.B.5
6. Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set. 6.EE.B.6
7. Solve real-world and mathematical problems by writing and solving equations of the form x + p = q and px = q for cases in which p,q and x are all nonnegative rational numbers. 6.EE.B.7
8. Write an inequality of the form x > c or x < c to represent a constraint or condition in a real-world or mathematical problem. Recognize that inequalities of the form x > c or x < c have infinitely many solutions; represent solutions of such inequalities on number line diagrams. 6.EE.B.8

C Represent and analyze quantitative relationships between dependent and independent variables.

9. Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation. 6.EE.C.9

Geometry

A Solve real-world and mathematical problems involving area, surface area, and volume.

1. Find the area of right triangles, other triangles, special quadrilaterals, and polygons by flexibly, efficiently, and accurately composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems. 6.G.A.1
2. Find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes of the appropriate unit fraction edge lengths, and show that the volume is the same as would be found by multiplying the edge lengths of the prism. Apply the formulas V = l w h and V = b h to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems. 6.G.A.2
3. Draw polygons in the coordinate plane given coordinates for the vertices; use coordinates to find the length of a side joining points with the same first coordinate or the same second coordinate. Apply these techniques in the context of solving real-world and mathematical problems. 6.G.A.3
4. Represent three-dimensional figures using nets made up of rectangles and triangles, and use the nets to find the surface area of these figures. Apply these techniques in the context of solving realworld and mathematical problems. 6.G.A.4

Statistics and Probability

A Develop understanding of statistical variability

1. Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers.
2. Understand that a set of data collected to answer a statistical question has a distribution which can be described by its center, spread, and overall shape.
3. Recognize that a measure of center for a numerical data set summarizes all of its values with a single number, while a measure of variation describes how its values vary with a single number.

B Summarize and describe distributions

4. Display numerical data in plots on a number line, including dot plots, histograms, and box plots. 6.SP.B.4
5. Summarize numerical data sets in relation to their context including reporting data points, describe what's being measured, and find the "center" (mean and/or median) and "spread" (interquartile range and/or mean absolute deviation) of the data. Understand the shape of the data and identify any striking deviations (outliers) and connect these features to the context where the data came from. 6.SP.B.5

Data Science

Formulate statistical investigative questions.

1 Formulate and recognize statistical investigative questions that are of interest to students to collect data from online sources and websites, smartphones, sensors, publicly available government agencies (NOAA, state agencies, etc.), and other modern devices. 6.DS.1

Collect data/ consider data.

2 Collect and record data with technology to identify and describe the characteristics of data sets. Understand that data can be collected (primary data) or existing data can be obtained from other sources (secondary data). 6.DS.2

Analyze the data.

3 Analyze data visualizations and describe measures of center and variability of quantitative data using appropriate displays (dot plots, boxplots). Describe key features of distributions for the variables including center, variability, and shape. 6.DS.3

Interpret results.

4 Use statistical evidence from analyses to answer the statistical investigative question and communicate results with comprehensive answers with some teacher guidance. 6.DS.4