Washington Mathematics

Grade 7

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 **Analyze proportional relationships and use them to solve real-world and mathematical problems.**

1 Flexibly, efficiently, and accurately compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units. 7.RP.A.1

2 Recognize and represent proportional relationships between quantities, including using equivalent ratios in a table, graphing on the coordinate plane to see of the graph is a straight line through origin, identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions, write equations for proportional relationships, and analyze graphs to understand what the data points tell them about the real-world situation, focusing on points like (0, 0) which represents no change and (1, r) where r is the unit rate. 7.RP.A.2

3 Flexibly, efficiently, and accurately use proportional relationships to solve multistep ratio and percent problems. 7.RP.A.3

The Number System

A Apply and extend previous understandings of operations with fractions.

1. Flexibly, efficiently, and accurately apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram showing the distance between two numbers is the absolute value of their difference, understand the concept of opposite quantities combining to zero (additive inverse), representing operations on number lines, and interpreting real-world scenarios in context. 7.NS.A.1
2. Flexibly, efficiently, and accurately apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers including the distributive property and properties of operations. Understand integers can be divided as long as the divisor isn't zero, resulting in rational numbers and convert rational numbers into decimals using long division, recognizing that the decimal form either ends in 0s or repeats eventually, and interpreting realworld contexts. 7.NS.A.2

Expressions and Equations

A Use properties of operations to generate equivalent expressions.

1. Flexibly, efficiently, and accurately use properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients. 7.EE.A.1
2. Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related. 7.EE.A.2

B Flexibly, efficiently, and accurately solve real-life and mathematical problems using numerical and algebraic expressions and equations.

3. Flexibly, efficiently, and accurately solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies. 7.EE.B.3
4. Use variables to represent quantities in a real-world or mathematical problem and write simple equations and inequalities to flexibly, efficiently, and accurately solve problems by reasoning about the quantities. Compare solving the same problem algebraically vs. with arithmetic, explaining the steps involved in each approach. Graph the solutions of these inequalities and interpret them in context of the problem. 7.EE.B.4

Geometry

A Draw, construct, and describe geometrical figures and describe the relationships between them.

1. Flexibly, efficiently, and accurately solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale. 7.G.A.1
2. Draw geometric shapes with given conditions. Focus on constructing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle. 7.G.A.2
3. Describe the two-dimensional figures that result from slicing three-dimensional figures, as in plane sections of right rectangular prisms and right rectangular pyramids. 7.G.A.3

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

4. Know the formulas for the area and circumference of a circle and use them to solve problems; give an informal derivation of the relationship between the circumference and area of a circle. 7.G.B.4
5. Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure. 7.G.B.5
6. Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms. 7.G.B.6

Statistics and Probability

A Use random sampling to draw inferences about a population.

1. Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population. Understand that random sampling tends to produce representative samples and support valid inferences. 7.SP.A.1
2. Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions. 7.SP.A.2

B Draw informal comparative inferences about two populations.

3. Informally assess the degree of visual overlap of two numerical data distributions with similar variabilities, measuring the difference between the centers by expressing it as a multiple of a measure of variability. 7.SP.B.3
4. Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations. 7.SP.B.4

C Investigate chance processes and develop, use, and evaluate probability models.

5 Understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring. Larger numbers indicate greater likelihood. A probability near 0 indicates an unlikely event, a probability around 1/2 indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event. 7.SP.C.5

6 Approximate the probability of a chance event by collecting data on the chance process that produces it and observing its long-run relative frequency, and predict the approximate relative frequency given the probability. 7.SP.C.6

7 Develop a probability model and use it to find probabilities of events. Compare probabilities from a model to observed frequencies; if the agreement is not good, explain possible sources of the discrepancy. 7.SP.C.7

8 Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation, understanding the probability of a compound event is a fraction of the outcomes of the sample space. Design and use a simulation to generate frequencies for compound events. 7.SP.C.8

Data Science

Formulate statistical investigative questions.

1 Pose statistical investigative questions about a broader population using samples taken from the population. 7.DS.1

Collect data/ consider data.

2 Understand information from a sample is valid only if the sample is representative of that population. Understand data can be used to make comparisons between different groups at one point in time and the same group over time. 7.DS.2

Analyze the data.

3 Identify, determine, and interpret measures of center (mean and median) and measures of variability (range, interquartile range) to answer a statistically investigative question, summarizing the distribution of data using the measures of center and variability. Use reasoning about distributions to compare two groups based on the variables. 7.DS.3

Interpret results.

4 Acknowledge that looking beyond the data is feasible and recognize the uncertainty caused by sample-to-sample variability when making comparisons and/or conclusions from data to answer the investigative question. 7.DS.4