

# Grade 6 Mathematics Overview

## **Connecting Ratio and Rate to Whole Number Multiplication and Division**

Students use reasoning about multiplication and division to solve ratio and rate problems about quantities. By viewing equivalent ratios and rates as deriving from, and extending, pairs of rows (or columns) in the multiplication table, and by analyzing simple drawings that indicate the relative size of quantities, students connect their understanding of multiplication and division with ratios and rates. Thus students expand the scope of problems for which they can use multiplication and division to solve problems, and they connect ratios and fractions. Students solve a wide variety of problems involving ratios and rates.

## **Completing Understanding of Division of Fractions, and Extending the Notion of “Numbers” to the System of Rational Numbers, Which Includes Negative Numbers**

Students use the meaning of fractions, the meanings of multiplication and division, and the relationship between multiplication and division to understand and explain why the procedures for dividing fractions make sense. Students use these operations to solve problems. Students extend their previous understandings of number and the ordering of numbers to the full system of rational numbers, which includes negative rational numbers, and in particular negative integers. They reason about the order and absolute value of rational numbers and about the location of points in all four quadrants of the coordinate plane.

## **Writing, Interpreting, and Using Expressions and Equations**

Students understand the use of variables in mathematical expressions. They write expressions and equations that correspond to given situations, evaluate expressions, and use expressions and formulas to solve problems. Students understand that expressions in different forms can be equivalent, and they use the properties of operations to rewrite expressions in equivalent forms. Students know that the solutions of an equation are the values of the variables that make the equation true. Students use properties of operations and the idea of maintaining the equality of both sides of an equation to solve simple one-step equations. Students construct and analyze tables, such as tables of quantities that are in equivalent ratios, and they use equations (such as  $3x = y$ ) to describe relationships between quantities.

## **Developing Understanding of Statistical Thinking**

Building on and reinforcing their understanding of number, students begin to develop their ability to think statistically. Students recognize that a data distribution may not have a definite center and that different ways to measure center yield different values. The median measures center in the sense that it is roughly the middle value. The mean measures center in the sense that it is the value that each data point would take on if the total of the data values were redistributed equally, and also in the sense that it is a balance point. Students recognize that a measure of variability (interquartile range or mean absolute deviation) can also be useful for summarizing data because two very different sets of data can have the same mean and median yet be distinguished by their variability. Students learn to describe and summarize numerical data sets, identifying clusters, peaks, gaps, and symmetry, considering the context in which the data were collected.

## Grade 6 Units

<p><b>Whole Numbers and Decimals</b></p> <ul style="list-style-type: none"> <li>• Divide Multi-Digit Numbers</li> <li>• Prime Factorization</li> <li>• Least Common Multiple</li> <li>• Greatest Common Factor</li> <li>• Add , Subtract, Multiply Decimals</li> <li>• Divide Decimals by Whole Numbers</li> <li>• Divide by Decimals</li> </ul>	<p><b>Fractions</b></p> <ul style="list-style-type: none"> <li>• Fractions and Decimals – converting</li> <li>• Compare and Order Fractions &amp; Decimals</li> <li>• Multiply Fractions</li> <li>• Simplify Factors</li> <li>• Divide Fractions</li> <li>• Divide Mixed Numbers</li> </ul>
<p><b>Rational Numbers</b></p> <ul style="list-style-type: none"> <li>• Understanding Positive and Negative Numbers</li> <li>• Compare and Order Integers</li> <li>• Rational Numbers and the Number Line</li> <li>• Compare and Order Rational Numbers</li> <li>• Absolute Value</li> <li>• Rational Numbers and the Coordinate Plane</li> <li>• Ordered Pair Relationships</li> <li>• Distance on the Coordinate Plane</li> </ul>	<p><b>Ratios and Rates</b></p> <ul style="list-style-type: none"> <li>• What are ratios and rates?</li> <li>• Equivalent Ratios and Multiplication Tables</li> <li>• Unit Rates</li> </ul> <p><b>Percents</b></p> <ul style="list-style-type: none"> <li>• Write Percents as Fractions and Decimals</li> <li>• Write Fractions and Decimals as Percents</li> <li>• Percent of a Quantity</li> <li>• Find the Whole from a Percent</li> </ul>
<p><b>Algebra: Expressions</b></p> <ul style="list-style-type: none"> <li>• Exponents</li> <li>• Evaluate Expressions Using Exponents</li> <li>• Write Algebraic Expressions</li> <li>• Identify Parts of Expressions</li> <li>• Evaluate Algebraic Expressions and Formulas</li> <li>• Combine Like Terms</li> <li>• Generate and Identify Equivalent Expressions</li> </ul>	<p><b>Algebra: Equations and Inequalities</b></p> <ul style="list-style-type: none"> <li>• Write Equations</li> <li>• Solve Equations: Addition, Subtraction, Multiplication, Division               <ul style="list-style-type: none"> <li>○ Solve equations including fractions</li> </ul> </li> <li>• Solutions of Inequalities</li> <li>• Write Inequalities</li> <li>• Graph Inequalities</li> </ul>
<p><b>Algebra: Relationships Between Variables</b></p> <ul style="list-style-type: none"> <li>• Independent and Dependent Variables</li> <li>• Equations: Graphs and Tables               <ul style="list-style-type: none"> <li>○ Draw graphs of linear equations from table, from equation</li> <li>○ Write linear equation from table, from graph</li> </ul> </li> </ul>	<p><b>Area</b></p> <ul style="list-style-type: none"> <li>• Area of Parallelograms, Triangles, Trapezoids, Regular Polygons</li> <li>• Composite Figures</li> <li>• Figures on the Coordinate Plane</li> </ul> <p><b>Surface Area and Volume</b></p> <ul style="list-style-type: none"> <li>• Three Dimensional Figures and Nets</li> <li>• Surface Area of Prisms and Pyramids</li> <li>• Volume of Rectangular Prisms</li> </ul>
<p><b>Statistics – Data Displays and Measures of Center</b></p> <ul style="list-style-type: none"> <li>• Recognize a Statistical Question</li> <li>• Describe Data Collection</li> <li>• Dot Plots, Frequency Tables, Histograms</li> <li>• Measures of Center</li> <li>• Effects of Outliers</li> </ul>	<p><b>Variability and Data Distributions</b></p> <ul style="list-style-type: none"> <li>• Box Plots</li> <li>• Measures of Center: Mean, Median, Mode</li> <li>• Measures of Variability: Mean Absolute Deviation, Range, IQR</li> <li>• Patterns in Data, Describing Distributions</li> </ul>

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