

# Table P2.1: Grades 6–8 Mathematics Standards for Ratios and Rates, Proportional Reasoning, and Linear Functions and Equations

| Grade 6<br>Ratios and Rates  | Grade 7<br>Proportional Reasoning   | Grade 8<br>Linear Functions and Equations  |
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| <p>6.1. Understand the concept of a ratio and use ratio language to describe the relationship between two quantities.</p> <p>6.2. Understand the concept of a unit rate associated with a ratio, and use rate language in the context of a ratio relationship.</p> <p>6.3. Make tables of equivalent ratios relating quantities with whole-number measurements, find missing values in the tables, and plot the pairs of values on the coordinate plane. Use tables to compare ratios.</p> <p>6.4. Solve unit rate problems including those involving unit pricing and constant speed.</p> | <p>7.1. Decide whether two quantities are in a proportional relationship, for example, by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin.</p> <p>7.2. Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.</p> <p>7.3. Represent proportional relationships using equations.</p> <p>7.4. Explain what a point <math>(x, y)</math> on the graph of a proportional relationship means in terms of the situation, with special attention to the points <math>(0, 0)</math> and <math>(1, r)</math> where <math>r</math> is the unit rate.</p> | <p>8.1. Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways.</p> <p>8.2. Use similar triangles to explain why the slope <math>m</math> is the same between any two distinct points on a non-vertical line in the coordinate plane; derive the equation <math>y = mx</math> for a line through the origin and the equation <math>y = mx + b</math> for a line intercepting the vertical axis at <math>b</math>.</p> <p>8.3. Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). <i>For example, given a linear function represented by a table of values and a linear function represented by an algebraic expression, determine which function has the greater rate of change.</i></p> <p>8.4. Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two <math>(x, y)</math> values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values.</p> |