

6th Grade Essential Standards

Essential Standard	What does proficiency look like?
Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities.	For example, "The ratio of wings to beaks in the bird house at the zoo was 2:1, because for every 2 wings there was 1 beak." "For every vote candidate A received, candidate C received nearly three votes."
Understand the concept of a unit rate a/b associated with a ratio $a:b$ with $b \neq 0$, and use rate language in the context of a ratio relationship.	For example, "This recipe has a ratio of 3 cups of flour to 4 cups of sugar, so there is $3/4$ cup of flour for each cup of sugar." "We paid \$75 for 15 hamburgers, which is a rate of \$5 per hamburger."
Display numerical data in plots on a number line, including dot plots, histograms, and box plots.	Students can show data on number lines, including dot plots, histograms, and box plots.
Summarize numerical data sets in relation to their context, such as by: a.) Reporting the number of observations. b.) Describing the nature of the attribute under investigation, including how it was measured and its units of measurement. c.) Describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered and the quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation) were given. d.) Relating the choice of measures of center and variability to the shape of the data distribution and the context in which the data were gathered.	Describe data sets (see standard)
Interpret, represent, and compute division of fractions by fractions and solve word problems by using visual fraction models (e.g., tape diagrams, area models, or number lines), equations, and the relationship between multiplication and division.	$1/3$ divided by $3/5$.
Flexibly and efficiently divide multi-digit whole numbers using strategies or algorithms based on place value, area models, and the properties of operations.	Four and five digit dividends with two or three digit divisors
Understand a rational number as a point on the number line. Extend number lines and coordinate axes familiar from previous grades to represent points on the line and in the plane with negative number coordinates. a) Recognize opposite signs of numbers as indicating locations on opposite sides of 0 on the number line; recognize that the opposite of the opposite of a number is the number itself, e.g., $-(-3) = 3$, and that 0 is its own opposite. b.) Understand signs of numbers in ordered pairs as indicating locations in quadrants of the coordinate plane; recognize that when two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes. c) Find and position integers and other rational numbers on a horizontal or vertical number line; find and position pairs of integers and other rational numbers on a coordinate plane.	Understand that $2/3$ is opposite $-2/3$ on the number line and 3 is the opposite of negative 3 which is 3 and 0 is its own opposite. Recognize that pairs that only have different signs will reflect across the x, y or both axes. Find and position integers on number lines and find and position pairs of integers on a coordinate plane.

Understand ordering and absolute value of rational numbers. a) Interpret statements of inequality as statements about the relative position of two numbers on a number line. c) Understand the absolute value of a rational number as its distance from 0 on the number line; interpret absolute value as magnitude for a positive or negative quantity in a real-world situation.	a) For example, interpret $-3 > -7$ as a statement that -3 is located to the right of -7 on a number line oriented from left to right. c) For example, for an account balance of -30 dollars, write $ -30 = 30$ to describe the size of the debt in dollars.
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.	Graph points in all four quadrants, develop coordinates for points that are reflected over the x or y axis.
Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems.	Find the volume of a prism using the formula $V = bh$ or $V = lwh$. Find the area of triangles using the formula $A = \frac{1}{2}bh$. Solve real-world problems using these formulas.
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.	Graph and/or complete polygon, find a length between two points on a coordinate plane.
Write and evaluate numerical expressions involving whole-number exponents.	Evaluate expressions with exponents, with up to 5 operations, including parenthesis
Write, read, and evaluate expressions in which letters stand for numbers. a) Write expressions that record operations with numbers and with letters standing for numbers. c) Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including those involving whole number exponents, in the conventional order when there are no parentheses to specify a particular order (order of operations).	Solve $5x = 10$, Write an expression for take x from 7, Solve $4 - f$ for $f = 2$
Identify when two expressions are equivalent (e.g., when the two expressions name the same number regardless of which value is substituted into them).	Does $5x + 1 = 10 - x$
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.	Write equations with two variables including addition, subtraction, and multiplication. Sam (s) is 4 years older than Dawn (d). $s = d + 4$