

# Sixth Grade Benchmarks Mathematics

Level 5 – Student performance exceeds year-end standard

Level 4 – Student performance meets year-end standard

Level 3 – Student performance approaches year-end standard

Level 2 – Student demonstrates limited performance to year-end standard

Level 1 – Student does not yet evidence understanding or application of skills related to year-end standard

NOTE: MPI and MP11 performance levels are determined based on performance expectations at the time of reporting

Student Performance Standard	Level 1 Below	Level 2 Limited	Level 3 Approaches	Level 4 Meets	Level 5 Exceeds
<i>Ratios and Proportional Relationships:</i>					
Understand ratio concepts and use ratio reasoning to solve problems.	Describes a ratio relationship between two whole number quantities, and finds missing values in tables of proportional relationships with support; finds a percent as a rate per hundred and converts measurement units with scaffolding.	Describes a ratio relationship between two whole number quantities, finds missing values in tables of proportional relationships, and plots pairs of values on a coordinate plane; finds a percent as a rate per hundred and converts measurement units.	Uses ratio reasoning to solve unit rates in straightforward, well-posed, one-step problems.	Uses ratio reasoning to solve unit rates in multi-step problems. Solves one-step problems by finding the whole, given a part and a percent; describes a ratio relationship between any two number quantities (with a denominator $\leq 12$ ).	Solves multi-step problems by finding the whole, given a part and the percent; explains ratio relationships between any two number quantities; identifies relationships between models or representations.

<i>The Number System:</i>					
Apply understanding of multiplication and division to divide fractions by fractions.	Multiplies a fraction by a fraction, and divides a fraction by a whole number with support.	Multiplies a fraction by a fraction, and divides a fraction by a whole number; understands the effect that a fraction $>$ or $<$ 1 has on a whole number when multiplied.	Divides a whole number by a fraction between 0 and 1, and divides a mixed number by a whole number.	Divides a fraction by a fraction and makes connections to a visual model.	Uses visual models in settings where smaller fractions are divided by larger fractions; understands that a fraction multiplied or divided by $\frac{a}{a}$ is equivalent to the original fraction.
Compute fluently with multi-digit numbers and find common factors and multiples.	Adds, subtracts, and multiplies multi-digit whole numbers and decimals to hundredths with support.	Adds, subtracts, and multiplies multi-digit whole numbers and decimals to hundredths; uses the distributive property to express the	Divides multi-digit whole numbers and adds & subtracts multi-digit decimals; finds common factors of two numbers $\leq 100$ and multiples of two	Fluently divides multi-digit numbers, and performs all four operations on multi-digit decimals; finds the GCF of two numbers $\leq 100$	Makes generalizations regarding multiples and factors of sets of numbers (i.e. being relatively prime).

		sum of two whole numbers with a common factor.	numbers $\leq 12$ .	and the LCM of two whole numbers $\leq 12$ .	
Apply and extend previous understandings of numbers to the system of rational numbers.	Places integers on a number line and integer pairs on a coordinate plane with one-unit increments on both axes with support.	Places integers on a number line and integer pairs on a coordinate plane with one-unit increments on both axes.	Orders rational numbers and interprets statements of their order in situational context; places integers on a number line and integer pairs on a coordinate plane with various axis increments; relates changes in sign to placements on opposite sides of the number line and understands that absolute value is the distance from zero.	Relates statements of inequality to relative positions on a number line, places points with rational coordinates on a coordinate plane, and solves problems involving the distance between points; understands absolute value and ordering by using number lines and models and relates reflections across axes to changes in signs.	Solves problems calculating the distance between points on a coordinate plane and draws conclusions about reflections across axes without using a visual representation.

*Expressions and Equations:*

Apply and extend previous understandings of arithmetic to algebraic expressions.	Evaluates numerical expressions without exponents with support; writes one- or two-step numerical expressions with scaffolding; identifies parts of an expression, using mathematical terms, with prompting.	Evaluates numerical expressions without exponents; writes one- or two-step numerical expressions; identifies parts of an expression, using mathematical terms.	Evaluates numerical expressions with nonnegative integer exponents and algebraic expressions without exponents; writes one- and two-step algebraic expressions and identifies equivalent expressions.	Writes and evaluates numerical expressions with nonnegative integer exponents and algebraic expressions in real-world context; evaluates algebraic expressions that include nonnegative integer exponents using the distributive property; applies properties of operations to generate equivalent expressions.	Applies properties of operations to show why two expressions are equivalent.
Reason about and solve one-variable equations and inequalities.	Uses substitution to determine when a given number makes an equation or inequality true with prompting and support.	Uses substitution to determine when a given number makes an equation or inequality true.	Solves one-variable equations and inequalities with non-negative rational numbers; identifies and uses variables when writing equations.	Writes one-variable equations and inequalities with non-negative rational numbers; reasons about and solves equations and inequalities by writing and graphing	Solves equations and inequalities with rational numbers; writes and graphs solutions on a number line.

				solutions on a number line.	
Represent and analyze quantitative relationships between dependent and independent variables.	Identifies tables that represent relationships between two variables with prompting; plots points corresponding to equations on coordinate planes with support.	Identifies tables that represent relationships between two variables; plots points corresponding to equations on coordinate planes.	Uses variables to represent and analyze two quantities that change in relationship to each other; identifies and creates an equation that expresses one quantity in terms of another and uses graphs and tables to represent the relationship.	Uses graphs, tables, or context to analyze the relationship between dependent and independent variables and relates them to linear equations.	Uses graphs, tables, or context to analyze nonlinear and polynomial relationships between dependent and independent variables and relates them to nonlinear polynomial equations.

***Geometry:***

Solve real-world and mathematical problems involving area, surface area, and volume.	Finds areas of right triangles with support; finds the volume of right rectangular prisms with sides expressed as whole numbers.	Finds areas of right triangles; draws polygons with positive coordinates on a coordinate plane with scales in one-unit increments; finds the volume of right rectangular prisms with one side expressed as a fraction or mixed number in halves or fourths.	Finds areas of special quadrilaterals and triangles; draws polygons on a coordinate plane with scales in one-unit increments; finds the volume of right rectangular prisms with one side expressed as a fraction or mixed number.	Solves problems that involve finding areas of polygons and special quadrilaterals and triangles; finds the volume of right rectangular prisms with all sides expressed as fractions or mixed numbers; solves problems by drawing polygons on a coordinate plane with scales in various integer increments.	Solves problems by finding surface area of three-dimensional shapes composed of rectangles and triangles; finds the volume of a compound figure composed of right rectangular prisms.
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***Statistics and Probability:***

Develop understanding of statistical variability.	Identifies questions that lead to variable responses posed in familiar contexts and recognizes them as statistical with prompting and support.	Identifies questions that lead to variable responses posed in familiar contexts and recognizes them as statistical.	Recognizes that questions leading to variable responses are statistical and vice versa; identifies a reasonable measure of central tendency with respect to a familiar context.	Understands that a measure of center summarizes all of its values with a single number, while a measure of variation describes how its values vary; identifies a reasonable center and spread with respect to a	Justifies the reasonableness of identified center and spread with respect to an unfamiliar context; creates or completes a data set with given measures (i.e., mean, median, mode, interquartile range).
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				context.	
Summarize and describe distributions.	Summarizes or displays numerical data on a number line, in dot plots, and in histograms with prompting. Finds the median of an odd number of data points and finds the mean of nonnegative integers with support and scaffolding.	Summarizes or displays numerical data on a number line, in dot plots, and in histograms; finds the median of an odd number of data points and finds the mean of nonnegative integers.	Calculates mean and median and understands that they can be different or the same; uses the measure of center to summarize data with respect to the context.	Summarizes or displays data in box plots and finds the interquartile range; uses interquartile range and measures of center to describe overall patterns in data distribution.	Relates measures of center and variability to the shape of the data distribution in context of the data; finds mean absolute deviation and identifies outliers; predicts effects a change in data points would have on the mean and median.