

# Grade 6 Mathematics

## Performance Level Descriptors

### Limited

A student performing at the **Limited Level** demonstrates a minimal command of Ohio's Learning Standards for Grade 6 Mathematics. A student at this level has an **emerging ability** to divide fractions by fractions and demonstrate understanding of negative rational numbers, use ratio reasoning to solve problems, use expressions with variables to represent and solve problems, and use visual displays to solve problems involving the coordinate plane, to find measures of two- and three-dimensional figures, and to summarize distributions of data.

A student whose performance lies within the **Limited Level** typically can:

- Carry out some routine procedures to solve straightforward one-step problems;
- Recognize solutions to straightforward problems involving some simple computation;
- Compute a few numbers accurately;
- Recognize a few grade level mathematical concepts, terms, and properties, and use previous grade level mathematical concepts, terms, and properties.

A student at the **Limited Level** can:

- Write a ratio to describe a familiar relationship between two quantities using given information;
- Find the percent of a quantity using 100 grids;
- Use models to solve simple problems involving ratios;
- Complete simple ratio tables;
- Solve simple routine unit rate problems;
- Plot pairs of positive values on the coordinate plane.
- Evaluate numerical expressions with two operations;
- Understand the use of variables in simple mathematical expressions;
- Identify expressions and equations that correspond to given routine situations;
- Evaluate one-step expressions;
- Apply the understanding of equivalent expressions to identify equivalent expressions;
- Solve simple one-step equations involving addition and subtraction;
- Write a one-variable equation to express one quantity in terms of the other quantity;
- Use substitution to determine whether a given number makes an equation true.
- Divide simple multi-digit whole numbers;
- Recognize a visual model for division of a fraction by a fraction;
- Add, subtract, and multiply multi-digit whole numbers and decimals to hundredths using strategies and algorithms;
- Can identify or locate a positive or negative whole number on a number line.
- Identify the median of an odd number of whole number data points;
- Find areas of right triangles using grid paper;
- Find the volume of rectangular prisms with whole number sides;
- Draw polygons in the coordinate plane given coordinates in the first quadrant;
- Display simple numerical data using number lines and dot plots.

## Basic

A student performing at the **Basic Level** demonstrates partial command of Ohio's Learning Standards for Grade 6 Mathematics. A student at this level has a **general ability** to divide fractions by fractions and demonstrate understanding of negative rational numbers, use ratio reasoning to solve problems, use expressions with variables to represent and solve problems, and use visual displays to solve problems involving the coordinate plane, to find measures of two- and three-dimensional figures, and to summarize distributions of data.

A student whose performance falls within the **Basic Level** typically can:

- Carry out routine procedures;
- Solve simple problems using visual representations;
- Compute accurately some grade level numbers and operations;
- Recall and recognize some grade level mathematical concepts, terms, and properties, and use more previous grade level mathematical concepts, terms, and properties.

A student at the **Basic Level** can:

- Write a ratio to describe a familiar relationship between two quantities;
- Find missing values in tables of equivalent ratios;
- Solve familiar straightforward unit rate problems;
- Find a percent of a quantity as a rate per 100 using 100 grids;
- Solve routine straightforward problems involving ratios;
- Solve routine straightforward real-world unit rate problems (including unit pricing);
- Complete a table of familiar measurement unit conversions within the same system;
- Write and evaluate numerical expressions with up to two operations including those with exponents of 2 and 3;
- Understand the use of variables in simple mathematical expressions;
- Identify one- and two-step expressions and equations that correspond to given familiar situations;
- Evaluate algebraic expressions with up to two operations;
- Identify up to two-step equivalent expressions;
- Solve one-step equations with positive integer coefficients;
- Write a one-variable equation to express one quantity in terms of the other quantity.
- Interpret a visual model for division of a fraction by a fraction;
- Divide multi-digit whole numbers;
- Add and subtract multi-digit decimal numbers;
- Divide multi-digit decimals by whole number divisors;
- Find common factors of two numbers less than or equal to 100;
- Find common multiples of two numbers less than or equal to 12;
- Use positive and negative numbers to represent quantities in real-world contexts;
- Find and position positive and negative rational numbers on a horizontal or vertical number line and on a coordinate plane;
- Use number lines to compare and order positive and negative numbers;
- Represent real-world quantities with positive and negative numbers;
- Locate points in all four quadrants of the coordinate plane;
- Find the median of an even number of whole number data points; find the mean of whole number data points;
- Display numerical data using number lines and dot plots;
- Find areas of polygons with whole number side lengths by decomposing them into rectangles and triangles;
- Find volumes of rectangular prisms with whole number side lengths;
- Draw polygons in one quadrant of the coordinate plane;
- Solve routine real-world and mathematical problems by graphing points in the first quadrant; Given nets, find surface areas of rectangular prisms with whole number side lengths.

## Proficient

A student performing at the **Proficient Level** demonstrates an appropriate command of Ohio's Learning Standards for Grade 6 Mathematics. A student whose performance falls within the **Proficient Level** has a **consistent ability** to divide fractions by fractions and demonstrate understanding of negative rational numbers, use ratio reasoning to solve problems, use expressions with variables to represent and solve problems, and use visual displays to solve problems involving the coordinate plane, to find measures of two- and three-dimensional figures, and to summarize of data.

A student whose performance falls within the **Proficient Level** typically can:

- Solve most routine and straightforward problems accurately;
- Compute accurately with most grade level numbers and operations;
- Apply most grade level mathematical concepts, terms, and properties, and use informal reasoning (visual representation and language) and some formal reasoning.

A student at the **Proficient Level** can:

- Write a ratio to describe a relationship between two quantities;
- Understand the concept of unit rates;
- Find a percent of a quantity as a rate per 100;
- Solve a wide variety of routine problems involving ratios and rates;
- Use ratio tables to solve routine real-world problems;
- Solve routine mathematical and real-world unit rate problems (including unit pricing and constant speed);
- Convert measurement units within the same system using ratio reasoning;
- Write and evaluate numerical expressions including those with whole number exponents;
- Understand the use of variables in simple mathematical expressions;
- Write expressions and equations that correspond to given routine situations;
- Evaluate algebraic expressions;
- Apply the understanding of equivalent expressions to identify equivalent expressions;
- Write and solve one-step equations with positive integer coefficients;
- Write and graph solutions to inequalities on a number line;
- Write a one-variable equation to express one quantity in terms of the other quantity;
- Divide a fraction by a fraction using a visual model;
- Find the greatest common factor of two numbers less than or equal to 100;
- Find the least common multiple of two whole numbers less than or equal to 12;
- Add, subtract, multiply, and divide multi-digit decimals;
- Use number lines to compare and order positive and negative numbers;
- Represent real-world quantities with positive and negative numbers;
- Locate points and ordered pairs in all four quadrants of the coordinate plane (understand the signs in ordered pairs);
- Calculate median, mean, and range;
- Display numerical data using number lines, dot plots, histograms, and box plots;
- Find areas of polygons by decomposing them into rectangles and triangles;
- Find volumes of rectangular prisms with fractional edge lengths;
- Draw polygons in the coordinate plane;
- Solve routine real-world and mathematical problems by graphing points in the first quadrant;
- Use nets to find surface areas of rectangular and triangular prisms and pyramids.

## Accelerated

A student performing at the **Accelerated Level** demonstrates a strong command of Ohio's Learning Standards for Grade 6 Mathematics. A student at this level has a **superior ability** to divide fractions by fractions and demonstrate understanding of negative rational numbers, use ratio reasoning to solve problems, use expressions with variables to represent and solve problems, and use visual displays to solve problems involving the coordinate plane, to find measures of two- and three-dimensional figures, and to summarize distributions of data.

A student whose performance falls within the **Accelerated Level** typically can:

- Accurately solve routine and straightforward problems;
- Solve a variety of routine and multi-step problems;
- Compute accurately and efficiently with familiar numbers;
- Recognize connections between mathematical concepts, terms, and properties, and use informal and some formal reasoning with symbolic representation.

A student at the **Accelerated Level** can:

- Select appropriate representations and strategies to solve mathematical and real-world ratio and rate problems;
- Solve a wide variety of problems involving ratios and rates;
- Apply ratio reasoning to convert measurement units within the same system;
- Write expressions and equations that correspond to given situations;
- Evaluate complex algebraic expressions including exponents;
- Apply the properties of operations to write equivalent expressions;
- Write and solve equations with positive rational coefficients;
- Given a situation, write an inequality and graph solutions on a number line;
- Use tables and graphs to analyze the relationship between dependent and independent variables and relate these to the equation;
- Divide a fraction by a fraction using visual models and equations;
- Use least common multiples and greatest common factors to solve routine real-world problems;
- Add, subtract, multiply, and divide multi-digit decimals to solve real-world problems;
- Use number lines to compare and order positive and negative numbers;
- Represent real-world quantities with positive and negative numbers;
- Locate points and ordered pairs in all four quadrants of the coordinate plane (understand the signs in ordered pairs);
- Calculate interquartile range;
- Find mean absolute deviation;
- Choose the correct measure of center relating to a certain context;
- Describe and summarize numerical distributions (data sets) by identifying clusters, peaks, gaps, and symmetry, in relationship to the context in which the data were collected;
- Display and interpret numerical data using number lines, dot plots, histograms, and box plots;
- Solve mathematical problems by finding the area of a two-dimensional shape composed of rectangles and triangles;
- Solve mathematical problems by finding the volumes of rectangular prisms with fractional edge lengths;
- Draw polygons in the coordinate plane and find lengths of horizontal and vertical sides to solve real-world problems;
- Solve real world and mathematical problems by graphing points in the first quadrant.

## Advanced

A student performing at the **Advanced Level** demonstrates a distinguished command of Ohio's Learning Standards for Grade 6 Mathematics. A student at this level has a **sophisticated ability** to divide fractions by fractions and demonstrate understanding of negative rational numbers, use ratio reasoning to solve problems, use expressions with variables to represent and solve problems, and use visual displays to solve problems involving the coordinate plane, to find measures of two- and three-dimensional figures, and to summarize distributions of data.

A student whose performance falls within the **Advanced Level** typically can:

- Solve routine and straightforward problems accurately and efficiently;
- Solve a variety of non-routine multi-step problems;
- Compute accurately and efficiently;
- Recognize, apply, and justify mathematical concepts, terms, and properties and their connections, and use more formal reasoning and symbolic representation (precise mathematical language).

A student at the **Advanced Level** can:

- Select efficient representations and strategies to solve mathematical and real-world ratio and rate problems;
- Solve a wide variety of real-world problems involving ratios and rates, including where a ratio is associated with a rate;
- Solve a variety of non-routine problems requiring conversion of measurement units.
- Write expressions and equations for complex mathematical and real-world situations;
- Explain why two expressions are equivalent using precise mathematical language;
- Given a complex situation, write an inequality and graph solutions on a number line;
- Analyze the relationship between dependent and independent variables represented in tables and graphs, and then write an appropriate equation;
- Divide a fraction by a fraction;
- Efficiently use least common multiples and greatest common factors to solve real-world problems;
- Write, interpret, and explain statements of order in real-world contexts;
- Represent real-world quantities with positive and negative numbers;
- Graph ordered pairs in all four quadrants of the coordinate plane;
- Use mean absolute deviation to interpret data;
- Choose, calculate, and justify the correct measure of center relating to a certain context;
- Describe numerical distributions (data sets) by identifying clusters, peaks, gaps, and symmetry, in relationship to the context in which the data were collected;
- Solve non-routine mathematical problems by finding the area of a two-dimensional shape composed of rectangles and triangles;
- Solve real-world problems by finding the volumes of rectangular prisms with fractional edge lengths;
- Solve real-world and mathematical problems by graphing points and/or polygons in the coordinate plane.