Mathematics Benchmarks for Grade 6

Mathematics Content
Strand: *Ratios and Proportional Relationships (RP)*
Understand ratio concepts and use ratio reasoning to solve problems.
Use ratio language to describe a ratio relationship between two quantities
Compare a unit rate a/b with a ratio a:b with b ≠ 0
Use rate language in the context of a ratio relationship
Make tables of equivalent ratios relating quantities with whole number measurements
Find missing values in a table of equivalent ratios relating quantities with whole number measurements
Plot pairs of values of equivalent ratios on the coordinate plane
Compare equivalent ratios using tables
Solve unit rate problems including those involving unit pricing and constant speed
Find a percent of a quantity as a rate per 100
Solve problems by finding the whole, given a part and the percent
Convert measurement units using ratio reasoning
Manipulate measurement units when multiplying or dividing quantities
Transform measurement units when multiplying or dividing quantities
Strand: *The Number System (NS)*
Apply and extend previous understandings of multiplication and division to divide fractions by fractions.
Interpret quotients of fractions
Compute quotients of fractions
Solve word problems involving division of fractions by fractions
Compute fluently with multi-digit numbers and find common factors and multiples.
Divide multi-digit numbers fluently using the standard algorithm
Add, subtract, multiply, and divide multi-digit decimals fluently using the standard algorithm for each operation
Find the greatest common factor of two whole numbers less than or equal to 100
Find the least common multiple of two whole numbers less than or equal to 12
Use the distributive property to express a sum of two whole numbers from 1 to 100 with a common factor as a multiple of a sum of two whole numbers with no common factor
Apply and extend previous understandings of numbers to the system of rational numbers.
Show that positive and negative numbers are used together to describe quantities having opposite directions or values
Explain the meaning of zero when using positive and negative numbers to represent quantities in real-world contexts
Express opposite signs of numbers as indicating locations on opposite sides of 0 on the number line
Show that the opposite of the opposite of a number is the number itself
Show that 0 is its own opposite
Show that signs of numbers in ordered pairs indicate locations in quadrants of the coordinate plane
Show that when two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes in quadrants of the coordinate plane
Find integers and other rational numbers on a horizontal or vertical number line diagram
Position integers and other rational numbers on a horizontal or vertical number line diagram
Find pairs of integers and other rational numbers on a coordinate plane
Position pairs of integers and other rational numbers on a coordinate plane
Use the relative position of two numbers on a number line diagram to interpret statements of inequality
Write statements of order for rational numbers using real-world context
Interpret statements of order for rational numbers using real-world contexts
Explain statements of order for rational numbers using real-world contexts
Use the distance from 0 on the number line to identify the absolute value of a rational number

Mathematics Benchmarks for Grade 6

Use the distance from 0 on the number line to interpret the absolute value as magnitude for a positive or negative quantity in a real-world situation
Distinguish comparisons of absolute value from statements about order
Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane
Strand: *Expressions and Equations (EE)*
Apply and extend previous understandings of arithmetic to algebraic expressions.
Write numerical expressions involving whole-number exponents
Evaluate numerical expressions involving whole-number exponents
Write expressions that record operations with numbers and with letters standing for numbers
Identify parts of an expression using mathematical terminology
Describe one or more parts of an expression as a single entity
Evaluate expressions at specific values of their variables
Use Order of Operations to perform arithmetic operations in the conventional order when there are no parentheses to specify a particular order
Apply the properties of operations to generate equivalent expressions
Determine the equivalency of two expressions
Reason about and solve one-variable equations and inequalities.
Determine the set of values that make an equation or inequality true
Use substitution to determine whether a given number in a specified set makes an equation or inequality true
Solve a real world or mathematical problem by writing expressions with variables representing numbers
Show that a variable represents an unknown number or any number in a specified set
Solve real-world and mathematical problems by using equations of the form x + p = q for cases in which p, q and x are all nonnegative rational numbers
Solve real-world and mathematical problems by using equations of the form px = q for cases in which p, x and q are all nonnegative rational numbers

Write an inequality of the form x > c or x < c to represent a real world or mathematical constraint or condition
Show that inequalities of the form x > c or x < c have infinitely many solutions
Represent solutions of inequalities of the form x > c or x < c on number line diagrams
Represent and analyze quantitative relationships between dependent and independent variables.
Solve a real world problem that uses variables to represent two quantities that change in relationship to one another
Write an equation that expresses one quantity as the independent variable and the second quantity as the dependent variable
Analyze the relationship between the dependent and independent variables using graphs and tables
Relate graphs and tables to a written equation that expresses one quantity as the independent variable and the second quantity as the dependent variable
Strand: *Geometry (G)*
Solve real-world and mathematical problems involving area, surface area, and volume.
Find the area of right triangles, non-right triangles, special quadrilaterals, and polygons by composing into rectangles
Find the area of right triangles, non-right triangles, special quadrilaterals, and polygons by decomposing into triangles and other shapes
Solve real world problems by finding the area of right triangles, non-right triangles, special quadrilaterals, and polygons by composing into rectangles
Solve real world problems by finding the area of right triangles, non-right triangles, special quadrilaterals, and polygons by decomposing into triangles and other shapes
Find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes of the appropriate unit fraction edge lengths
Compare the volume of a right rectangular prism with fractional edge lengths found by packing it with unit cubes of unit fraction edge lengths to the volume of a right rectangular prism found by multiplying edge lengths of the prism

Mathematics Benchmarks for Grade 6

Solve real world and mathematical problems by applying the formula V = l w h to find volumes of right rectangular prisms with fractional edge lengths
Solve real world and mathematical problems by applying the formula V = b h to find volumes of right rectangular prisms with fractional edge lengths
Draw polygons in the coordinate plane given coordinates for the vertices
Use coordinates in the coordinate plane to find the length of a side joining points with the same first or the same second coordinate
Solve real world problems by drawing polygons in the coordinate plane and finding the length of a side joining points with the same first or the same second coordinate
Represent three-dimensional figures using nets made up of rectangles and triangles
Use nets made up of rectangles and triangles representing three-dimensional figures to find the surface area of these figures
Solve real world and mathematical problems by representing three-dimensional figures by using nets made up of rectangles and triangles
Strand: *Statistics and Probability (SP)*
Develop understanding of statistical variability.
Identify a statistical question
Identify the characteristics of a statistical distribution of a set of data
Locate a measure of center for a numerical data set
Locate a measure of variation for a numerical data set
Summarize and describe distributions.
Display numerical data in plots on a number line
Summarize numerical data sets in relation to their context by reporting the number of observations
Summarize numerical data sets in relation to their context by describing how it was measured and its units of measurement
Summarize numerical data sets in relation to their context by using quantitative measures of center
Summarize numerical data sets in relation to their context by using quantitative measures of variability
Summarize numerical data sets by describing overall patterns and deviations from the overall patterns with reference to the context in which the data were gathered
Summarize numerical data sets by relating measures of center and variability to the shape of the data distribution in the context in which the data were gathered
Mathematical Practice
Strand: Solve Problems (MP1)
Make sense of problems and persevere in solving them
Strand: Reason (MP2)
Reason abstractly and quantitatively.
Strand: Construct Arguments (MP3)
Construct viable arguments and critique the reasoning of others.
Construct viable arguments and critique the reasoning of others
Strand: Model (MP4)
Model with mathematics.
Strand: Use Tools (MP5)
Use appropriate tools strategically
Strand: Attend to Precision (MP6)
Attend to precision
Strand: Use Structure (MP7)
Look for and make use of structure
Strand: Express Regularity (MP8)
Look for and express regularity in repeated reasoning.