Kentucky Mathematics

Grade 6

Adopted 2019

Standards for Mathematical Practice

1. **Make sense of problems and persevere in solving them.** MP.1
2. **Reason abstractly and quantitatively.** MP.2
3. **Construct viable arguments and critique the reasoning of others.** MP.3
4. **Model with mathematics.** MP.4
5. **Use appropriate tools strategically.** MP.5
6. **Attend to precision.** MP.6
7. **Look for and make use of structure.** MP.7
8. **Look for and express regularity in repeated reasoning.** MP.8

Geometry

Solve real-world and mathematical problems involving area, surface area and volume.

1. Find the area of right triangles, other triangles, special quadrilaterals and polygons by composing into rectangles or decomposing into triangles and quadrilaterals; apply these techniques in the context of solving real-world and mathematical problems. KY.6.G.1
2. Find the volume of a right rectangular prism with rational number edge lengths. Apply the formulas V = lwh and V = Bh to find volumes of right rectangular prisms with rational number edge lengths in the context of solving real-world and mathematical problems. KY.6.G.2
3. 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. KY.6.G.3
4. Classify three-dimensional figures including cubes, prisms, pyramids, cones and spheres. KY.6.G.4

Ratios and Proportional Relationships

Understanding ratio concepts and use ratio reasoning to solve problems.

Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. KY.6.RP.1

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2. Understand the concept of a unit rate a/b associated with a ratio a:b with B ≠ 0 and use rate language in the context of a ratio relationship. KY.6.RP.2
3. Use ratio and rate reasoning to solve real-world and mathematical problems. KY.6.RP.3
    a. 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. KY.6.RP.3.A
    b. Solve rate problems including those involving unit pricing and constant speed. KY.6.RP.3.B
    c. Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities. KY.6.RP.3.C

The Number System

Apply and extend previous understandings of multiplication and division to divide fractions by fractions.

1. Interpret and compute quotients of fractions and solve word problems involving division of fractions by fractions. KY.6.NS.1

Compute fluently with multi-digit numbers and find common factors and multiples.

2. Fluently divide multi-digit numbers using an algorithm. KY.6.NS.2
    a. Convert a rational number to a decimal using long division. KY.6.NS.2.A
    b. Know that the decimal form of a rational number terminates in 0s or eventually repeats. KY.6.NS.2.B
3. Fluently add, subtract, multiply and divide multi-digit decimals using an algorithm for each operation. KY.6.NS.3
4. Use the distributive property to express a sum of two whole numbers 1 – 100 with a common factor as a multiple of a sum of two whole numbers with no common factor. KY.6.NS.4

Apply and extend previous understanding of numbers to the system of rational numbers.

5. Understand that positive and negative numbers are used together to describe quantities having opposite directions or values; use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation. KY.6.NS.5

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6. Understand a rational number as a point on the number line. Extend number line diagrams and coordinate axes, using appropriate range and intervals, to represent points on the line and in the plane, that include negative numbers and coordinates. KY.6.NS.6

    a. Recognize opposite signs of numbers as indicating locations on opposite sides of 0 on the number line; recognize 0 is its own opposite and the opposite of a positive number is a negative, and the opposite of a negative number is a positive, such as−(−3)=3. KY.6.NS.6.A

    b. Find and position integers and other rational numbers on a horizontal or vertical number line diagram; find and position pairs of integers and other rational numbers on a coordinate plane. KY.6.NS.6.B

    c. Understand signs of numbers in ordered pairs as indicating locations in quadrants of the coordinate plane; recognize the similarity between whole numbers, their negative opposites and their positions on a number line, ordered pairs differ only by signs and their locations on one or both axes. KY.6.NS.6.C

7. Understand ordering and absolute value of rational numbers. KY.6.NS.7

    a. Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram. KY.6.NS.7.A

    b. Write, interpret and explain statements of order for rational numbers in real-world contexts. KY.6.NS.7.B

    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. KY.6.NS.7.C

    d. Distinguish comparisons of absolute value from statements about order. KY.6.NS.7.D

8. 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. KY.6.NS.8

Expression and Equations

Understanding ratio concepts and use ratio reasoning to solve problems.

1. Write and evaluate numerical expressions involving whole-number exponents. KY.6.EE.1

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2. Write, read and evaluate expressions in which letters stand for numbers. KY.6.EE.2
    a. Write expressions that record operations with numbers and with letters standing for numbers. KY.6.EE.2.A
    b. Identify parts of an expression using mathematical terms (sums, term, product, factor, quotient, coefficient); view one or more parts of an expression in a single entity. KY.6.EE.2.B
    c. Evaluate expressions for specific values of their variables, including values that are non-negative rational numbers. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including whole-number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations). KY.6.EE.2.C
3. Apply the properties of operations to generate equivalent expressions. KY.6.EE.3
4. Identify when two expressions are equivalent when the two expressions name the same number regardless of which value is substituted into them. KY.6.EE.4

Reason about and solve one-variable equation and inequalities.

5. Understand solving an equation or inequality as a process of answering a question: which values from a specified set, if any, make the equation or inequality true? Use substitution to determine whether a given number in a specified set makes an equation or inequality true. KY.6.EE.5
6. Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or depending on the purpose at hand, any number in a specified set. KY.6.EE.6
7. Solve real-world and mathematical problems by writing and solving equations of the form $x + p = q$ and $px = q$ for cases in which p, q and x are all nonnegative rational numbers. KY.6.EE.7
8. Write an inequality of the form $x > c$, $x < c$, $x \geq c$, or $x \leq c$ to represent a constraint or condition in a real-world or mathematical problem. Recognize that inequalities of these forms have infinitely many solutions; represent solutions of such inequalities on vertical and horizontal number lines. KY.6.EE.8

Represent and analyze quantitative relationships between dependent and independent variables.

9. Use variables to represent two quantities in a real-world problem that changes in relationship to one another; KY.6.EE.9
    a. Appropriately recognize one quantity as the dependent variable and the other as the independent variable. KY.6.EE.9.A
    b. 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. KY.6.EE.9.B
    c. Analyze the relationship between the dependent and independent variables using graphs and tables and relate these to the question. KY.6.EE.9.C

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Statistics and Probability

Develop understanding of the process of statistical reasoning.

0. Apply the four-step investigative process for statistical reasoning. KY.6.SP.0
    a. Formulate Questions: Formulate a statistical question as one that anticipates variability and can be answered with data. KY.6.SP.0.A
    b. Collect Data: Design and use a plan to collect appropriate data to answer a statistical question. KY.6.SP.0.B
    c. Analyze Data: Select appropriate graphical methods and numerical measures to analyze data by displaying variability within a group, comparing individual to individual and comparing individual to group. KY.6.SP.0.C

Develop understanding of statistical variability.

1. Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers. KY.6.SP.1
2. Understand that a set of numerical data collected to answer a statistical question has a distribution which can be described by its center, spread and overall shape. KY.6.SP.2
3. Recognize that a measure of center for a numerical data set summarizes all of its values with a single number to describe a typical value, while a measure of variation describes how the values in the distribution vary. KY.6.SP.3

Summarize and describe distributions.

4. Display the distribution of numerical data in plots on a number line, including dot plots, histograms and box plots. KY.6.SP.4
5. Summarize numerical data sets in relation to their context, such as by: KY.6.SP.5
    a. Reporting the number of observations. KY.6.SP.5.A
    b. Describing the nature of the attribute under investigation, including how it was measured and its units of measurement. KY.6.SP.5.B
    c. Determining quantitative measures of center (median and/or mean) to describe distribution of numerical data. KY.6.SP.5.C
    d. Describing distributions of numerical data qualitatively relating to shape (using terms such as cluster, mode(s), gap, symmetric, uniform, skewed-left, skewed-right and the presence of outliers) and quantitatively relating to spread/variability (using terms such as range and interquartile range). KY.6.SP.5.D
    e. Relating the choice of measures of center and variability to the shape of the data distribution. KY.6.SP.5.E