Kentucky Mathematics

Grade 7

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

Draw, construct and describe geometrical figures and describe the relationships between them.

1. Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale. KY.7.G.1
2. Draw (freehand, with ruler and protractor and with technology) geometric shapes with given conditions. Focus on constructing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle. KY.7.G.2
3. Describe the two-dimensional figures that result from slicing three-dimensional figures, as in plane sections of right rectangular prisms and right rectangular pyramids. KY.7.G.3

Solve real-life and mathematical problems involving angle measure, area, surface area and volume.

4. Use formulas for area and circumference of circles and their relationships. KY.7.G.4
   a. Apply the formulas for the area and circumference of a circle to solve real-world and mathematical problems. KY.7.G.4.A
   b. Explore and understand the relationship between the radius, diameter, circumference and area of a circle. KY.7.G.4.B

Skip to main content

5. Apply properties of supplementary, complementary, vertical and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure. KY.7.G.5
6. Solve problems involving area of two-dimensional objects and surface area and volume of three-dimensional objects. KY.7.G.6
    a. Solve real-world and mathematical problems involving area of two-dimensional objects composed of triangles, quadrilaterals and other polygons. KY.7.G.6.A
    b. Solve real-world and mathematical problems involving volume and surface area, using nets as needed, of three-dimensional objects including cubes, pyramids and right prisms. KY.7.G.6.B

Ratios and Proportional Relationships

Analyze proportional relationships and use them to solve real-world and mathematical problems.

1. Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units. KY.7.RP.1
2. Recognize and represent proportional relationships between quantities. KY.7.RP.2
    a. Decide whether two quantities represent a proportional relationship. KY.7.RP.2.A
    b. Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams and verbal descriptions of proportional relationships. KY.7.RP.2.B
    c. Represent proportional relationships by equations. KY.7.RP.2.C
    d. Explain what a point (x, y) on the graph of a proportional relationship means in terms of the situation, with special attention to the points (0, 0) and (1, r) where r is the unit rate. KY.7.RP.2.D
3. Use percents to solve mathematical and real-world problems. KY.7.RP.3
    a. Find a percent of a quantity as a rate per 100; solve problems involving finding the whole, a part and a percent, given two of these. KY.7.RP.3.A
    b. Use proportional relationships to solve multistep ratio and percent problems. KY.7.RP.3.B

The Number System

Apply and extend previous understandings of operations with fractions to add, subtract, multiply and divide rational numbers.

Skip to main content

1. Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram. KY.7.NS.1

    a. Describe situations in which opposite quantities combine to make 0. KY.7.NS.1.A

    b. Understand p + q as the number located a distance |q| from p, in the positive or negative direction depending on whether q is positive or negative. Show that a number and its opposite have a sum of 0 (are additive inverses). Interpret sums of rational numbers by describing real-world contexts. KY.7.NS.1.B

    c. Understand subtraction of rational numbers as adding the additive inverse, p - q = p + (-q). Show that the distance between two rational numbers on the number line is the absolute value of their difference and apply this principle in real-world contexts. KY.7.NS.1.C

    d. Apply properties of operations as strategies to add and subtract rational numbers. KY.7.NS.1.D

2. Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers. KY.7.NS.2

    a. Understand that multiplication is extended from fractions to rational numbers by requiring that operations continue to satisfy the properties of operations, particularly the distributive property, leading to products such as (–1)(–1) = 1 and the rules for multiplying signed numbers. Interpret products of rational numbers by describing real-world contexts. KY.7.NS.2.A

    b. Understand that integers can be divided, provided that the divisor is not zero and every quotient of integers (with non-zero divisor) is a rational number. If p and q are integers, then –(p/q) = (–p)/q = p/(–q). Interpret quotients of rational numbers by describing real-world contexts. KY.7.NS.2.B

    c. Apply properties of operations as strategies to multiply and divide rational numbers. KY.7.NS.2.C

3. Solve real-world and mathematical problems involving the four operations with rational numbers. KY.7.NS.3

Expression and Equations

Use properties of operations to generate equivalent expressions.

1. Apply properties of operations as strategies to add, subtract, factor and expand linear expressions with rational coefficients. KY.7.EE.1

2. Understand that rewriting an expression in different forms in a problem context can clarify the problem and how the quantities in it are related. KY.7.EE.2

Solve real-life and mathematical problems using numerical and algebraic expressions and equations.

3. Solve real-life and mathematical problems posed with positive and negative rational numbers in any form, using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies. KY.7.EE.3

Skip to main content

4. Use variables to represent quantities in a real-world or mathematical problem and construct equations and inequalities to solve problems by reasoning about the quantities. KY.7.EE.4

    a. Solve word problems leading to equations of the form px + q = r and p(x + q) = r, where p, q and r are specific rational numbers. Solve equations of these forms. Graph the solution set of the equality and interpret it in context of the problem. KY.7.EE.4.A

    b. Solve word problems leading to inequalities of the form px + q > r, px + q < r, px + q ≥ r, px + q ≤ r, where p, q and r are specific rational numbers. Graph the solution set of the inequality and interpret it in context of the problem. KY.7.EE.4.B

Statistics and Probability

Use random sampling to draw inferences about a population.

0. Create displays, including circle graphs (pie charts), scaled pictographs and bar graphs, to compare and analyze distributions of categorical data from both matching and different-sized samples. KY.7.SP.0

1. Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population. Understand that random sampling tends to produce representative samples and support valid inferences. KY.7.SP.1

2. Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. KY.7.SP.2

    a. Generate multiple samples of categorical data of the same size to gauge the variation in estimates or predictions. KY.7.SP.2.A

    b. Generate multiple samples (or simulated samples) of numerical data to gauge the variation in estimates or predictions. KY.7.SP.2.B

    c. Gauge how far off an estimate or prediction might be related to a population character of interest. KY.7.SP.2.C

Draw informal comparative inferences about two populations.

3. Describe the degree of visual overlap (and separation) from the graphical representations of two numerical data distributions (box plots, dot plots) with similar variabilities with similar contexts (same variable), measuring the difference between the centers (medians or means) by expressing this difference as a multiple of a measure of variability (interquartile range when comparing medians or the mean absolute deviation when comparing means). KY.7.SP.3

4. Calculate and use measures of center (mean and median) and measures of variability (interquartile range when comparing medians and mean absolute deviation when comparing means) for numerical data from random samples to draw informal comparative inferences about two populations. KY.7.SP.4

Investigate chance processes and develop, use and evaluate probability models.

Skip to main content

5. Describe the probability of a chance event is a number between 0 and 1, which tells how likely the event is, from impossible (0) to certain (1). A probability near 0 indicates an unlikely event, a probability around ½ indicates an event that is neither unlikely nor likely and a probability near 1 indicates a likely event. KY.7.SP.5
6. Approximate the probability of a chance event by collecting data on the chance process that produces it and observing its long-run relative frequency and predict the approximate relative frequency given the probability. KY.7.SP.6
7. Develop a probability model and use it to find probabilities of events. Compare probabilities from a model to observed frequencies; if the agreement is not good, explain possible sources of the discrepancy. KY.7.SP.7
    a. Develop a uniform probability model by assigning equal probability to all outcomes and use the model to determine probabilities of events. KY.7.SP.7.A
    b. Develop a probability model (which may not be uniform) by observing frequencies in data generated from a chance process. KY.7.SP.7.B
8. Find probabilities of compound events using organized lists, tables, tree diagrams and simulation. KY.7.SP.8
    a. Explain just as with simple events, the probability of a compound event is the fraction of outcomes in the sample space for which the compound event occurs. KY.7.SP.8.A
    b. Represent sample spaces for compound events described in everyday language using methods such as organized lists, tables and tree diagrams. KY.7.SP.8.B
    c. Design and use a simulation to generate frequencies for compound events. KY.7.SP.8.C