

South Carolina Tutorials are designed specifically for the South Carolina College and Career Readiness Standards and the South Carolina Academic Standards to prepare students for the South Carolina End-of-Course Examination Program (EOCEP), ACT Aspire, and the South Carolina Palmetto Assessment of State Standards (SCPASS).

Math Tutorials offer targeted instruction, practice and review designed to develop computational fluency, deepen conceptual understanding, and apply mathematical practices. They automatically identify and address learning gaps down to elementary-level content, using adaptive remediation to bring students to grade-level no matter where they start. Students engage with the content in an interactive, feedback-rich environment as they progress through standards-aligned modules. By constantly honing the ability to apply their knowledge in abstract and real world scenarios, students build the depth of knowledge and higher order skills required to demonstrate their mastery when put to the test.

In each module, the Learn It and Try It make complex ideas accessible to students through focused content, modeled logic and process, multi-modal representations, and personalized feedback as students reason through increasingly challenging problems. The Review It offers a high impact summary of key concepts and relates those concepts to students' lives. The Test It assesses students' mastery of the module's concepts, providing granular performance data to students and teachers after each attempt. To help students focus on the content most relevant to them, unit-level pretests and posttests can quickly identify where students are strong and where they're still learning.

### Unit 1: Rate, Ratio, and Proportion

- **UNIT RATES**

- 7.RP.1: Ratios and Proportional Relationships Compute unit rates, including those involving complex fractions, with like or different units.

- **IDENTIFYING PROPORTIONAL RELATIONSHIPS**

- 7.RP.2.a: Ratios and Proportional Relationships Identify and model proportional relationships given multiple representations, including tables, graphs, equations, diagrams, verbal descriptions, and real-world situations. Determine when two quantities are in a proportional relationship.
- 7.RP.3: Ratios and Proportional Relationships Solve real-world and mathematical problems involving ratios and percentages using proportional reasoning (e.g., multi-step dimensional analysis, percent increase/decrease, tax).

- **ANALYZING PROPORTIONAL RELATIONSHIPS**

- 7.RP.2.b: Ratios and Proportional Relationships Identify and model proportional relationships given multiple representations, including tables, graphs, equations, diagrams, verbal descriptions, and real-world situations. Recognize or compute the constant of proportionality.

- 7.RP.2.c: Ratios and Proportional Relationships Identify and model proportional relationships given multiple representations, including tables, graphs, equations, diagrams, verbal descriptions, and real-world situations. Understand that the constant of proportionality is the unit rate.
- 7.RP.2.e: Ratios and Proportional Relationships Identify and model proportional relationships given multiple representations, including tables, graphs, equations, diagrams, verbal descriptions, and real-world situations. Investigate the graph of a proportional relationship and explain the meaning of specific points (e.g., origin, unit rate) in the context of the situation.
- 7.RP.1: Ratios and Proportional Relationships Compute unit rates, including those involving complex fractions, with like or different units.
- **REPRESENTING PROPORTIONAL RELATIONSHIPS**
  - 7.RP.2.a: Ratios and Proportional Relationships Identify and model proportional relationships given multiple representations, including tables, graphs, equations, diagrams, verbal descriptions, and real-world situations. Determine when two quantities are in a proportional relationship.
  - 7.RP.2.e: Ratios and Proportional Relationships Identify and model proportional relationships given multiple representations, including tables, graphs, equations, diagrams, verbal descriptions, and real-world situations. Investigate the graph of a proportional relationship and explain the meaning of specific points (e.g., origin, unit rate) in the context of the situation.
  - 7.RP.3: Ratios and Proportional Relationships Solve real-world and mathematical problems involving ratios and percentages using proportional reasoning (e.g., multi-step dimensional analysis, percent increase/decrease, tax).
  - 7.RP.2.d: Ratios and Proportional Relationships Identify and model proportional relationships given multiple representations, including tables, graphs, equations, diagrams, verbal descriptions, and real-world situations. Use equations to model proportional relationships.
- **USING PROPORTIONS TO SOLVE PROBLEMS**
  - 7.RP.3: Ratios and Proportional Relationships Solve real-world and mathematical problems involving ratios and percentages using proportional reasoning (e.g., multi-step dimensional analysis, percent increase/decrease, tax).
  - 7.RP.2.a: Ratios and Proportional Relationships Identify and model proportional relationships given multiple representations, including tables, graphs, equations, diagrams, verbal descriptions, and real-world situations. Determine when two quantities are in a proportional relationship.

## Unit 2: Addition and Subtraction of Rational Numbers

- **ADDING RATIONAL NUMBERS**
  - 7.NS.1.a: The Number System Extend prior knowledge of operations with positive rational numbers to add and to subtract all rational numbers and represent the sum or difference on a number line. Understand that the additive inverse of a number is its opposite and their sum is equal to zero.
  - 7.NS.1.b: The Number System Extend prior knowledge of operations with positive rational numbers to add and to subtract all rational numbers and represent the sum or difference on a number line.

Understand that the sum of two rational numbers ( $p + q$ ) represents a distance from  $p$  on the number line equal to  $q$  where the direction is indicated by the sign of  $q$ .

- 7.NS.3: The Number System Apply the concepts of all four operations with rational numbers to solve real-world and mathematical problems.
- 7.NS.1.b: The Number System Extend prior knowledge of operations with positive rational numbers to add and to subtract all rational numbers and represent the sum or difference on a number line. Understand that the sum of two rational numbers ( $p + q$ ) represents a distance from  $p$  on the number line equal to  $q$  where the direction is indicated by the sign of  $q$ .
- 7.NS.1.e: The Number System Extend prior knowledge of operations with positive rational numbers to add and to subtract all rational numbers and represent the sum or difference on a number line. Apply mathematical properties (e.g., commutative, associative, distributive, or the properties of identity and inverse elements) to add and subtract rational numbers.
- **SUBTRACTING RATIONAL NUMBERS**
  - 7.NS.1.a: The Number System Extend prior knowledge of operations with positive rational numbers to add and to subtract all rational numbers and represent the sum or difference on a number line. Understand that the additive inverse of a number is its opposite and their sum is equal to zero.
  - 7.NS.1.c: The Number System Extend prior knowledge of operations with positive rational numbers to add and to subtract all rational numbers and represent the sum or difference on a number line. Translate between the subtraction of rational numbers and addition using the additive inverse,  $p - q = p + (-q)$ .
  - 7.NS.1.e: The Number System Extend prior knowledge of operations with positive rational numbers to add and to subtract all rational numbers and represent the sum or difference on a number line. Apply mathematical properties (e.g., commutative, associative, distributive, or the properties of identity and inverse elements) to add and subtract rational numbers.
  - 7.NS.1.d: The Number System Extend prior knowledge of operations with positive rational numbers to add and to subtract all rational numbers and represent the sum or difference on a number line. Demonstrate that the distance between two rational numbers on the number line is the absolute value of their difference.
  - 7.NS.3: The Number System Apply the concepts of all four operations with rational numbers to solve real-world and mathematical problems.
- **USING PROPERTIES TO ADD AND SUBTRACT RATIONAL NUMBERS**
  - 7.NS.1.e: The Number System Extend prior knowledge of operations with positive rational numbers to add and to subtract all rational numbers and represent the sum or difference on a number line. Apply mathematical properties (e.g., commutative, associative, distributive, or the properties of identity and inverse elements) to add and subtract rational numbers.
  - 7.NS.3: The Number System Apply the concepts of all four operations with rational numbers to solve real-world and mathematical problems.
  - 7.NS.1.c: The Number System Extend prior knowledge of operations with positive rational numbers to add and to subtract all rational numbers and represent the sum or difference on a number line.

Translate between the subtraction of rational numbers and addition using the additive inverse,  $p - q = p + (-q)$ .

### Unit 3: Multiplication and Division of Rational Numbers

#### • MULTIPLYING RATIONAL NUMBERS

- 7.NS.2.b: The Number System Extend prior knowledge of operations with positive rational numbers to multiply and to divide all rational numbers. Understand sign rules for multiplying rational numbers.
- 7.NS.3: The Number System Apply the concepts of all four operations with rational numbers to solve real-world and mathematical problems.

#### • DIVIDING RATIONAL NUMBERS

- 7.NS.2.c: The Number System Extend prior knowledge of operations with positive rational numbers to multiply and to divide all rational numbers. Understand sign rules for dividing rational numbers and that a quotient of integers (with a non-zero divisor) is a rational number.
- 7.NS.3: The Number System Apply the concepts of all four operations with rational numbers to solve real-world and mathematical problems.
- 7.NS.2.d: The Number System Extend prior knowledge of operations with positive rational numbers to multiply and to divide all rational numbers. Apply mathematical properties (e.g., commutative, associative, distributive, or the properties of identity and inverse elements) to multiply and divide rational numbers.

#### • USING PROPERTIES TO MULTIPLY AND DIVIDE RATIONAL NUMBERS

- 7.NS.2.b: The Number System Extend prior knowledge of operations with positive rational numbers to multiply and to divide all rational numbers. Understand sign rules for multiplying rational numbers.
- 7.NS.2.c: The Number System Extend prior knowledge of operations with positive rational numbers to multiply and to divide all rational numbers. Understand sign rules for dividing rational numbers and that a quotient of integers (with a non-zero divisor) is a rational number.
- 7.NS.2.d: The Number System Extend prior knowledge of operations with positive rational numbers to multiply and to divide all rational numbers. Apply mathematical properties (e.g., commutative, associative, distributive, or the properties of identity and inverse elements) to multiply and divide rational numbers.
- 7.NS.3: The Number System Apply the concepts of all four operations with rational numbers to solve real-world and mathematical problems.
- 7.NS.2.a: The Number System Extend prior knowledge of operations with positive rational numbers to multiply and to divide all rational numbers. Understand that the multiplicative inverse of a number is its reciprocal and their product is equal to one.

### Unit 4: Working with Rational Numbers

#### • EXPRESSING RATIONAL NUMBERS IN DECIMAL FORM

- 7.NS.2.e: The Number System Extend prior knowledge of operations with positive rational numbers to multiply and to divide all rational numbers. Understand that some rational numbers can be written as

integers and all rational numbers can be written as fractions or decimal numbers that terminate or repeat.

- 7.NS.5: The Number System Extend prior knowledge to translate among multiple representations of rational numbers (fractions, decimal numbers, percentages). Exclude the conversion of repeating decimal numbers to fractions.
- **USING OPERATIONS ON RATIONAL NUMBERS TO SOLVE PROBLEMS**
- 7.NS.2.b: The Number System Extend prior knowledge of operations with positive rational numbers to multiply and to divide all rational numbers. Understand sign rules for multiplying rational numbers.
- 7.NS.2.c: The Number System Extend prior knowledge of operations with positive rational numbers to multiply and to divide all rational numbers. Understand sign rules for dividing rational numbers and that a quotient of integers (with a non-zero divisor) is a rational number.
- 7.NS.3: The Number System Apply the concepts of all four operations with rational numbers to solve real-world and mathematical problems.

### Unit 5: Algebraic Expressions, Equations, and Inequalities

- **SIMPLIFYING AND REWRITING ALGEBRAIC EXPRESSIONS**
- 7.EE.1: Expressions, Equations, and Inequalities Apply mathematical properties (e.g., commutative, associative, distributive) to simplify and to factor linear algebraic expressions with rational coefficients.
- 7.EE.2: Expressions, Equations, and Inequalities Recognize that algebraic expressions may have a variety of equivalent forms and determine an appropriate form for a given real-world situation.
- **SOLVING MULTI-STEP PROBLEMS WITH RATIONAL NUMBERS**
- 7.NS.1.e: The Number System Extend prior knowledge of operations with positive rational numbers to add and to subtract all rational numbers and represent the sum or difference on a number line. Apply mathematical properties (e.g., commutative, associative, distributive, or the properties of identity and inverse elements) to add and subtract rational numbers.
- 7.NS.2.d: The Number System Extend prior knowledge of operations with positive rational numbers to multiply and to divide all rational numbers. Apply mathematical properties (e.g., commutative, associative, distributive, or the properties of identity and inverse elements) to multiply and divide rational numbers.
- 7.NS.2.e: The Number System Extend prior knowledge of operations with positive rational numbers to multiply and to divide all rational numbers. Understand that some rational numbers can be written as integers and all rational numbers can be written as fractions or decimal numbers that terminate or repeat.
- 7.NS.3: The Number System Apply the concepts of all four operations with rational numbers to solve real-world and mathematical problems.
- 7.NS.5: The Number System Extend prior knowledge to translate among multiple representations of rational numbers (fractions, decimal numbers, percentages). Exclude the conversion of repeating decimal numbers to fractions.

- 7.EE.3: Expressions, Equations, and Inequalities Extend previous understanding of Order of Operations to solve multi-step real-world and mathematical problems involving rational numbers. Include fraction bars as a grouping symbol.
- 7.NS.2.b: The Number System Extend prior knowledge of operations with positive rational numbers to multiply and to divide all rational numbers. Understand sign rules for multiplying rational numbers.
- 7.NS.2.c: The Number System Extend prior knowledge of operations with positive rational numbers to multiply and to divide all rational numbers. Understand sign rules for dividing rational numbers and that a quotient of integers (with a non-zero divisor) is a rational number.
- **SOLVING TWO-STEP EQUATIONS**
  - 7.EE.4.a: Expressions, Equations, and Inequalities Apply the concepts of linear equations and inequalities in one variable to real-world and mathematical situations. Write and fluently solve linear equations of the form  $ax + b = c$  and  $a(x + b) = c$  where  $a$ ,  $b$ , and  $c$  are rational numbers.
  - 7.EE.4.b: Expressions, Equations, and Inequalities Apply the concepts of linear equations and inequalities in one variable to real-world and mathematical situations. Write and solve multi-step linear equations that include the use of the distributive property and combining like terms. Exclude equations that contain variables on both sides.
  - 7.NS.4.b: The Number System Understand and apply the concepts of comparing and ordering to rational numbers. Use concepts of equality and inequality to write and explain real-world and mathematical situations.
  - 7.EE.4.d: Expressions, Equations, and Inequalities Apply the concepts of linear equations and inequalities in one variable to real-world and mathematical situations. Identify and justify the steps for solving multi-step linear equations and two-step linear inequalities.
- **SOLVING LINEAR INEQUALITIES**
  - 7.NS.4.b: The Number System Understand and apply the concepts of comparing and ordering to rational numbers. Use concepts of equality and inequality to write and explain real-world and mathematical situations.
  - 7.EE.4.c: Expressions, Equations, and Inequalities Apply the concepts of linear equations and inequalities in one variable to real-world and mathematical situations. Write and solve two-step linear inequalities. Graph the solution set on a number line and interpret its meaning.
  - 7.EE.4.d: Expressions, Equations, and Inequalities Apply the concepts of linear equations and inequalities in one variable to real-world and mathematical situations. Identify and justify the steps for solving multi-step linear equations and two-step linear inequalities.

## Unit 6: Drawing, Constructing, and Exploring Geometric Figures

- **SCALE DRAWINGS**
  - 7.GM.1: Geometry and Measurement Determine the scale factor and translate between scale models and actual measurements (e.g., lengths, area) of real-world objects and geometric figures using proportional reasoning.
- **GEOMETRIC DRAWINGS**

- 7.GM.2.c: Geometry and Measurement Construct triangles and special quadrilaterals using a variety of tools (e.g., freehand, ruler and protractor, technology). Construct special quadrilaterals (i.e., kite, trapezoid, isosceles trapezoid, rhombus, parallelogram, rectangle) given specific parameters about angles or sides.
- 7.GM.2.a: Geometry and Measurement Construct triangles and special quadrilaterals using a variety of tools (e.g., freehand, ruler and protractor, technology). Construct triangles given all measurements of either angles or sides.
- 7.GM.2.b: Geometry and Measurement Construct triangles and special quadrilaterals using a variety of tools (e.g., freehand, ruler and protractor, technology). Decide if the measurements determine a unique triangle, more than one triangle, or no triangle.
- **CROSS-SECTIONS OF GEOMETRIC SOLIDS**
  - 7.GM.3: Geometry and Measurement Describe two-dimensional cross-sections of three-dimensional figures, specifically right rectangular prisms and right rectangular pyramids.

## Unit 7: Geometry in Two and Three Dimensions

- **CIRCLES**
  - 7.GM.4.d: Geometry and Measurement Investigate the concept of circles. Use the formulas for circumference and area of circles appropriately to solve real-world and mathematical problems.
  - 7.GM.6.d: Geometry and Measurement Apply the concepts of two- and three-dimensional figures to real-world and mathematical situations. Use the formulas for area, volume, and surface area appropriately.
  - 7.GM.4.a: Geometry and Measurement Investigate the concept of circles. Demonstrate an understanding of the proportional relationships between diameter, radius, and circumference of a circle.
  - 7.GM.4.b: Geometry and Measurement Investigate the concept of circles. Understand that the constant of proportionality between the circumference and diameter is equivalent to  $\pi$ .
  - 7.GM.4.c: Geometry and Measurement Investigate the concept of circles. Explore the relationship between circumference and area using a visual model.
- **ANGLE RELATIONSHIPS**
  - 7.GM.5: Geometry and Measurement Write equations to solve problems involving the relationships between angles formed by two intersecting lines, including supplementary, complementary, vertical, and adjacent.
- **AREA, VOLUME, AND SURFACE AREA**
  - 7.GM.6.a: Geometry and Measurement Apply the concepts of two- and three-dimensional figures to real-world and mathematical situations. Understand that the concept of area is applied to two-dimensional figures such as triangles, quadrilaterals, and polygons.
  - 7.GM.6.b: Geometry and Measurement Apply the concepts of two- and three-dimensional figures to real-world and mathematical situations. Understand that the concepts of volume and surface area are

applied to three-dimensional figures such as cubes, right rectangular prisms, and right triangular prisms.

- 7.GM.6.c: Geometry and Measurement Apply the concepts of two- and three-dimensional figures to real-world and mathematical situations. Decompose cubes, right rectangular prisms, and right triangular prisms into rectangles and triangles to derive the formulas for volume and surface area.

## Unit 8: Statistics and Sampling

### • POPULATIONS AND SAMPLES

- 7.DSP.1.a: Data Analysis, Statistics, and Probability Investigate concepts of random sampling. Understand that a sample is a subset of a population and both possess the same characteristics.
- 7.DSP.2: Data Analysis, Statistics, and Probability Draw inferences about a population by collecting multiple random samples of the same size to investigate variability in estimates of the characteristic of interest.
- 7.DSP.1.b: Data Analysis, Statistics, and Probability Investigate concepts of random sampling. Differentiate between random and non-random sampling.
- 7.DSP.1.c: Data Analysis, Statistics, and Probability Investigate concepts of random sampling. Understand that generalizations from a sample are valid only if the sample is representative of the population.
- 7.DSP.1.d: Data Analysis, Statistics, and Probability Investigate concepts of random sampling. Understand that random sampling is used to gather a representative sample and supports valid inferences about the population.
- 7.DSP.4: Data Analysis, Statistics, and Probability Compare the numerical measures of center (mean, median, mode) and variability (range, interquartile range, mean absolute deviation) from two random samples to draw inferences about the populations.

### • COMPARING DATA SETS VISUALLY

- 7.DSP.3: Data Analysis, Statistics, and Probability Visually compare the centers, spreads, and overlap of two displays of data (i.e., dot plots, histograms, box plots) that are graphed on the same scale and draw inferences about this data.
- 7.DSP.4: Data Analysis, Statistics, and Probability Compare the numerical measures of center (mean, median, mode) and variability (range, interquartile range, mean absolute deviation) from two random samples to draw inferences about the populations.

### • USING STATISTICAL MEASURES TO COMPARE DATA SETS

- 7.DSP.3: Data Analysis, Statistics, and Probability Visually compare the centers, spreads, and overlap of two displays of data (i.e., dot plots, histograms, box plots) that are graphed on the same scale and draw inferences about this data.
- 7.DSP.4: Data Analysis, Statistics, and Probability Compare the numerical measures of center (mean, median, mode) and variability (range, interquartile range, mean absolute deviation) from two random samples to draw inferences about the populations.



- 7.DSP.2: Data Analysis, Statistics, and Probability Draw inferences about a population by collecting multiple random samples of the same size to investigate variability in estimates of the characteristic of interest.

## Unit 9: Probability

### • PROBABILITY

- 7.DSP.5.b: Data Analysis, Statistics, and Probability Investigate the concept of probability of chance events. Understand that probability measures likelihood of a chance event occurring.
- 7.DSP.5.c: Data Analysis, Statistics, and Probability Investigate the concept of probability of chance events. Understand that the probability of a chance event is a number between 0 and 1.
- 7.DSP.5.d: Data Analysis, Statistics, and Probability Investigate the concept of probability of chance events. Understand that a probability closer to 1 indicates a likely chance event.
- 7.DSP.5.e: Data Analysis, Statistics, and Probability Investigate the concept of probability of chance events. Understand that a probability close to 0 indicates that a chance event is neither likely nor unlikely.
- 7.DSP.5.f: Data Analysis, Statistics, and Probability Investigate the concept of probability of chance events. Understand that a probability closer to 0 indicates an unlikely chance event.
- 7.DSP.5.a: Data Analysis, Statistics, and Probability Investigate the concept of probability of chance events. Determine probabilities of simple events.
- 7.DSP.6.a: Data Analysis, Statistics, and Probability Investigate the relationship between theoretical and experimental probabilities for simple events. Determine approximate outcomes using theoretical probability.
- 7.DSP.1.a: Data Analysis, Statistics, and Probability Investigate concepts of random sampling. Understand that a sample is a subset of a population and both possess the same characteristics.
- 7.DSP.1.b: Data Analysis, Statistics, and Probability Investigate concepts of random sampling. Differentiate between random and non-random sampling.
- 7.DSP.1.d: Data Analysis, Statistics, and Probability Investigate concepts of random sampling. Understand that random sampling is used to gather a representative sample and supports valid inferences about the population.
- 7.DSP.2: Data Analysis, Statistics, and Probability Draw inferences about a population by collecting multiple random samples of the same size to investigate variability in estimates of the characteristic of interest.

### • CALCULATING PROBABILITY

- 7.DSP.5.a: Data Analysis, Statistics, and Probability Investigate the concept of probability of chance events. Determine probabilities of simple events.
- 7.DSP.7.a: Data Analysis, Statistics, and Probability Apply the concepts of theoretical and experimental probabilities for simple events. Differentiate between uniform and non-uniform probability models (distributions).

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- 7.DSP.7.b: Data Analysis, Statistics, and Probability Apply the concepts of theoretical and experimental probabilities for simple events. Develop both uniform and non-uniform probability models.
  - 7.DSP.7.c: Data Analysis, Statistics, and Probability Apply the concepts of theoretical and experimental probabilities for simple events. Perform experiments to test the validity of probability models.
  - **PROBABILITY OF COMPOUND EVENTS**
    - 7.DSP.8.a: Data Analysis, Statistics, and Probability Extend the concepts of simple events to investigate compound events. Understand that the probability of a compound event is between 0 and 1.
    - 7.DSP.8.b: Data Analysis, Statistics, and Probability Extend the concepts of simple events to investigate compound events. Identify the outcomes in a sample space using organized lists, tables, and tree diagrams.
    - 7.DSP.8.c: Data Analysis, Statistics, and Probability Extend the concepts of simple events to investigate compound events. Determine probabilities of compound events using organized lists, tables, and tree diagrams.
  - **SIMULATIONS**
    - 7.DSP.8.d: Data Analysis, Statistics, and Probability Extend the concepts of simple events to investigate compound events. Design and use simulations to collect data and determine probabilities.
    - 7.DSP.8.e: Data Analysis, Statistics, and Probability Extend the concepts of simple events to investigate compound events. Compare theoretical and experimental probabilities for compound events.
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