

**Virtual Learning Academy**  
**Jefferson County Educational Service Center**  
**Academic Content Standards**  
**Math 07**

**Lesson 1 - Rational and Irrational Numbers; Adding Fractions and Mixed Fractions**

Math 7 Lesson 1 - Rational and Irrational Numbers; Adding Fractions and Mixed Fractions

<b>Standard Benchmark and Indicator</b>
S01. Number, Number Sense and Operations
B. Compare, order and convert among fractions, decimals and percents. (05-07)
03. Describe differences between rational and irrational numbers; e.g., use technology to show that some numbers (rational) can be expressed as terminating or repeating decimals and other (irrational) as non-terminating and non-repeating decimals. (07)
I. Use a variety of strategies, including proportional reasoning, to estimate, compute, solve and explain solutions to problems involving integers, fractions, decimals and percents. (05-07)
07. Solve problems using the appropriate form of a rational number (fraction, decimal or percent). (07)

**Lesson 2 - Subtracting Fractions and Mixed Fractions**

Math 7 Lesson 2 - Subtracting Fractions and Mixed Fractions

<b>Standard Benchmark and Indicator</b>
S01. Number, Number Sense and Operations
I. Use a variety of strategies, including proportional reasoning, to estimate, compute, solve and explain solutions to problems involving integers, fractions, decimals and percents. (05-07)
07. Solve problems using the appropriate form of a rational number (fraction, decimal or percent). (07)

**Lesson 3 - Multiplying Fractions and Mixed Fractions**

Math 7 Lesson 3 - Multiplying Fractions and Mixed Fractions

<b>Standard Benchmark and Indicator</b>
S01. Number, Number Sense and Operations
I. Use a variety of strategies, including proportional reasoning, to estimate, compute, solve and explain solutions to problems involving integers, fractions, decimals and percents. (05-07)
07. Solve problems using the appropriate form of a rational number (fraction, decimal or percent). (07)

**Lesson 4 - Reciprocals and Division of Fractions**

Math 7 Lesson 4 - Reciprocals and Division of Fractions

<b>Standard Benchmark and Indicator</b>
S01. Number, Number Sense and Operations
I. Use a variety of strategies, including proportional reasoning, to estimate, compute, solve and explain solutions to problems involving integers, fractions, decimals and percents. (05-07)
07. Solve problems using the appropriate form of a rational number (fraction,

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decimal or percent). (07)

**Lesson 5 - Exponents, Square Roots and Place Values**

Math 7 Lesson 5 - Exponents, Square Roots and Place Values

**Standard Benchmark and Indicator**

S01. Number, Number Sense and Operations

B. Compare, order and convert among fractions, decimals and percents. (05-07)

01. Demonstrate an understanding of place value using powers of 10 and write large numbers in scientific notation. (07)

E. Use order of operations, including use of parenthesis and exponents to solve multi-step problems, and verify and interpret the results. (05-07)

02. Explain the meaning of exponents that are negative or 0. (07)

**Lesson 6 - Equivalent Decimals, Decimal Computations – Add, Subtract and Multiply**

Math 7 Lesson 6 - Equivalent Decimals, Decimal Computations – Add, Subtract and Multiply

**Standard Benchmark and Indicator**

S01. Number, Number Sense and Operations

I. Use a variety of strategies, including proportional reasoning, to estimate, compute, solve and explain solutions to problems involving integers, fractions, decimals and percents. (05-07)

07. Solve problems using the appropriate form of a rational number (fraction, decimal or percent). (07)

**Lesson 7 - Decimal Division**

Math 7 Lesson 7 - Decimal Division

**Standard Benchmark and Indicator**

S01. Number, Number Sense and Operations

I. Use a variety of strategies, including proportional reasoning, to estimate, compute, solve and explain solutions to problems involving integers, fractions, decimals and percents. (05-07)

07. Solve problems using the appropriate form of a rational number (fraction, decimal or percent). (07)

**Lesson 8 - Scientific Notation, Problem Solving – Fraction and Decimal Applications**

Math 7 Lesson 8 - Scientific Notation, Problem Solving – Fraction and Decimal Applications

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large numbers in scientific notation. (07)
I. Use a variety of strategies, including proportional reasoning, to estimate, compute, solve and explain solutions to problems involving integers, fractions, decimals and percents. (05-07)
07. Solve problems using the appropriate form of a rational number (fraction, decimal or percent). (07)

**Lesson 9 - Test Over Units 1 – 8**

**Lesson 10 - Customary System of Measurement**

Math 7 Lesson 10 - Customary System of Measurement

<b>Standard Benchmark and Indicator</b>
S02. Measurement
B. Convert units of length, area, volume, mass and time within the same measurement system. (05-07)
02. Convert units of area and volume within the same measurement system using proportional reasoning and a reference table when appropriate; e.g., square feet to square yards, cubic meters to cubic centimeters. (07)
D. Select a tool and measure accurately to a specified level of precision. (05-07)
03. Estimate a measurement to a greater degree of precision than the tool provides. (07)
E. Use problem solving techniques and technology as needed to solve problems involving length, weight, perimeter, area, volume, time and temperature. (05-07)
04. Solve problems involving proportional relationships and scale factors; e.g., scale models that require unit conversions within the same measurement system. (07)

**Lesson 11 - Metric System of Measurement**

Math 7 Lesson 11 - Metric System of Measurement

<b>Standard Benchmark and Indicator</b>
S02. Measurement
B. Convert units of length, area, volume, mass and time within the same measurement system. (05-07)
02. Convert units of area and volume within the same measurement system using proportional reasoning and a reference table when appropriate; e.g., square feet to square yards, cubic meters to cubic centimeters. (07)

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**Lesson 12 - Ratios, Proportions, Rates, Scale Factors, and Models**

Math 7 Lesson 12 - Ratios, Proportions, Rates, Scale Factors, and Models

<b>Standard Benchmark and Indicator</b>
<b>S02. Measurement</b>
A. Select appropriate units to measure angles, circumference, surface area, mass and volume, using: (05-07)
01. Select appropriate units for measuring derived measurements; e.g., miles per hour, revolutions per minute. (07)
E. Use problem solving techniques and technology as needed to solve problems involving length, weight, perimeter, area, volume, time and temperature. (05-07)
04. Solve problems involving proportional relationships and scale factors; e.g., scale models that require unit conversions within the same measurement system. (07)
<b>S03. Geometry and Spatial Sense</b>
E. Use proportions to express relationships among corresponding parts of similar figures. (05-07)
06. Determine and use scale factors for similar figures to solve problems using proportional reasoning. (07)
J. Apply properties of equality and proportionality to solve problems involving congruent or similar figures; e.g., create a scale drawing. (05-07)
06. Determine and use scale factors for similar figures to solve problems using proportional reasoning. (07)

**Lesson 13 - Percents, Fractions, and Decimals**

Math 7 Lesson 13 - Percents, Fractions, and Decimals

<b>Standard Benchmark and Indicator</b>
<b>S01. Number, Number Sense and Operations</b>
H. Use and analyze the steps in standard and non-standard algorithms for computing with fractions, decimals and integers. (05-07)
08. Develop and analyze algorithms for computing with percents and integers, and demonstrate fluency in their use. (07)

**Lesson 14 - Percent Applications**

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Math 7 Lesson 14 - Percent Applications

<b>Standard Benchmark and Indicator</b>
S01. Number, Number Sense and Operations
H. Use and analyze the steps in standard and non-standard algorithms for computing with fractions, decimals and integers. (05-07)
08. Develop and analyze algorithms for computing with percents and integers, and demonstrate fluency in their use. (07)

**Lesson 15 - Comparing Integers, Absolute Value, Adding and Subtracting Integers**

Math 7 Lesson 15 - Comparing Integers, Absolute Value, Adding and Subtracting Integers

<b>Standard Benchmark and Indicator</b>
S01. Number, Number Sense and Operations
G. Apply and explain the use of prime factorizations, common factors, and common multiples in problem situations. (05-07)
09. Represent and solve problem situations that can be modeled by and solved using concepts of absolute value, exponents and square roots (for perfect squares). (07)
H. Use and analyze the steps in standard and non-standard algorithms for computing with fractions, decimals and integers. (05-07)
08. Develop and analyze algorithms for computing with percents and integers, and demonstrate fluency in their use. (07)
I. Use a variety of strategies, including proportional reasoning, to estimate, compute, solve and explain solutions to problems involving integers, fractions, decimals and percents. (05-07)
05. Explain the meaning and effect of adding, subtracting, multiplying and dividing integers; e.g., how adding two integers can result in a lesser value. (07)
09. Represent and solve problem situations that can be modeled by and solved using concepts of absolute value, exponents and square roots (for perfect squares). (07)

**Lesson 16 - Multiplying and Dividing Integers, Perfect Squares and Square Roots**

Math 7 Lesson 16 - Multiplying and Dividing Integers, Perfect Squares and Square Roots

<b>Standard Benchmark and Indicator</b>
S01. Number, Number Sense and Operations
G. Apply and explain the use of prime factorizations, common factors, and common multiples in problem situations. (05-07)
09. Represent and solve problem situations that can be modeled by and solved using concepts of absolute value, exponents and square roots (for perfect squares). (07)
H. Use and analyze the steps in standard and non-standard algorithms for

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computing with fractions, decimals and integers. (05-07)
08. Develop and analyze algorithms for computing with percents and integers, and demonstrate fluency in their use. (07)
I. Use a variety of strategies, including proportional reasoning, to estimate, compute, solve and explain solutions to problems involving integers, fractions, decimals and percents. (05-07)
05. Explain the meaning and effect of adding, subtracting, multiplying and dividing integers; e.g., how adding two integers can result in a lesser value. (07)
09. Represent and solve problem situations that can be modeled by and solved using concepts of absolute value, exponents and square roots (for perfect squares). (07)

**Lesson 17 - Order of Operations, Applying Integers, Composite Shapes**

Math 7 Lesson 17 - Order of Operations, Applying Integers, Composite Shapes

<b>Standard Benchmark and Indicator</b>
<b>S01. Number, Number Sense and Operations</b>
E. Use order of operations, including use of parenthesis and exponents to solve multi-step problems, and verify and interpret the results. (05-07)
04. Use order of operations and properties to simplify numerical expressions involving integers, fractions and decimals. (07)
I. Use a variety of strategies, including proportional reasoning, to estimate, compute, solve and explain solutions to problems involving integers, fractions, decimals and percents. (05-07)
06. Simplify numerical expressions involving integers and use integers to solve real-life problems. (07)
<b>S02. Measurement</b>
C. Identify appropriate tools and apply appropriate techniques for measuring angles, perimeter or circumference and area of triangles, quadrilaterals, circles and composite shapes, and surface area and volume of prisms and cylinders. (05-07)
07. Develop strategies to find the area of composite shapes using the areas of triangles, parallelograms, circles and sectors. (07)
E. Use problem solving techniques and technology as needed to solve problems involving length, weight, perimeter, area, volume, time and temperature. (05-07)
05. Analyze problem situations involving measurement concepts, select appropriate strategies, and use an organized approach to solve narrative and increasingly complex problems. (07)

**Lesson 18 - First Semester Test**

**Lesson 19 - Measuring and Identifying Angles**

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<b>Standard Benchmark and Indicator</b>
S03. Geometry and Spatial Sense
G. Describe and use properties of triangles to solve problems involving angle measures and side lengths of right triangles. (05-07)
03. Use and demonstrate understanding of the properties of triangles. For example: (07)
03. Use Pythagorean Theorem to solve problems involving right triangles. (07)
03. Use triangle angle sum relationships to solve problems. (07)

**Lesson 20 - Polygons and Quadrilaterals**

Math 7 Lesson 20 - Polygons and Quadrilaterals

<b>Standard Benchmark and Indicator</b>
S03. Geometry and Spatial Sense
D. Identify, describe and classify types of line pairs, angles, two-dimensional figures and three-dimensional objects using their properties. (05-07)
02. Determine sufficient (not necessarily minimal) properties that define a specific two-dimensional figure or three-dimensional object. For example: (07)
02. Determine when one set of figures is a subset of another; e.g., all squares are rectangles. (07)
02. Develop a set of properties that eliminates all but the desired figure; e.g., only squares are quadrilaterals with all sides congruent and all angles congruent. (07)

**Lesson 21 - Coordinate Graphing, Symmetry and Translations**

Math 7 Lesson 21 - Coordinate Graphing, Symmetry and Translations

<b>Standard Benchmark and Indicator</b>
S03. Geometry and Spatial Sense
F. Describe and use the concepts of congruence, similarity and symmetry to solve problems. (05-07)
07. Identify the line and rotation symmetries of two-dimensional figures to solve problems. (07)
H. Predict and describe results (size, position, orientation) of transformations of two-dimensional figures. (05-07)
08. Perform translations, reflections, rotations and dilations of two-dimensional figures using a variety of methods (paper folding, tracing, graph paper). (07)

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**Lesson 22 - Congruent and Similar Shapes, Pythagorean Theorem**

Math 7 Lesson 22 - Congruent and Similar Shapes, Pythagorean Theorem

Standard Benchmark and Indicator
S03. Geometry and Spatial Sense
E. Use proportions to express relationships among corresponding parts of similar figures. (05-07)
01. Use proportional reasoning to describe and express relationships between parts and attributes of similar and congruent figures. (07)
F. Describe and use the concepts of congruence, similarity and symmetry to solve problems. (05-07)
04. Determine necessary conditions for congruence of triangles. (07)
G. Describe and use properties of triangles to solve problems involving angle measures and side lengths of right triangles. (05-07)
03. Use and demonstrate understanding of the properties of triangles. For example: (07)
03. Use Pythagorean Theorem to solve problems involving right triangles. (07)
03. Use triangle angle sum relationships to solve problems. (07)
05. Apply properties of congruent or similar triangles to solve problems involving missing lengths and angle measures. (07)
J. Apply properties of equality and proportionality to solve problems involving congruent or similar figures; e.g., create a scale drawing. (05-07)
01. Use proportional reasoning to describe and express relationships between parts and attributes of similar and congruent figures. (07)

**Lesson 23 - Area**

Math 7 Lesson 23 - Area

Standard Benchmark and Indicator
S02. Measurement

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C. Identify appropriate tools and apply appropriate techniques for measuring angles, perimeter or circumference and area of triangles, quadrilaterals, circles and composite shapes, and surface area and volume of prisms and cylinders. (05-07)
06. Use strategies to develop formulas for finding area of trapezoids and volume of cylinders and prisms. (07)
07. Develop strategies to find the area of composite shapes using the areas of triangles, parallelograms, circles and sectors. (07)

**Lesson 24 - Solids, Visualizing Geometric Models**

Math 7 Lesson 24 - Solids, Visualizing Geometric Models

<b>Standard Benchmark and Indicator</b>
<b>S02. Measurement</b>
C. Identify appropriate tools and apply appropriate techniques for measuring angles, perimeter or circumference and area of triangles, quadrilaterals, circles and composite shapes, and surface area and volume of prisms and cylinders. (05-07)
06. Use strategies to develop formulas for finding area of trapezoids and volume of cylinders and prisms. (07)
G. Understand and demonstrate the independence of perimeter and area for two-dimensional shapes and of surface area and volume for three-dimensional shapes. (05-07)
08. Understand the difference between surface area and volume and demonstrate that two objects may have the same surface area, but different volumes or may have the same volume, but different surface areas. (07)
<b>S03. Geometry and Spatial Sense</b>
I. Identify and draw three-dimensional objects from different views (top, side, front and perspective). (05-07)
09. Draw representations of three-dimensional geometric objects from different views. (07)

**Lesson 25 – Volume**

Math 7 Lesson 25 - Volume

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<b>S02. Measurement</b>
C. Identify appropriate tools and apply appropriate techniques for measuring angles, perimeter or circumference and area of triangles, quadrilaterals, circles and composite shapes, and surface area and volume of prisms and cylinders. (05-07)
06. Use strategies to develop formulas for finding area of trapezoids and volume of cylinders and prisms. (07)
F. Analyze and explain what happens to area and perimeter or surface area and volume when the dimensions of an object are changed. (05-07)
09. Describe what happens to the surface area and volume of a three-dimensional object when the measurements of the object are changed; e.g., length of sides are doubled. (07)

**Lesson 26 - Surface Area**

Math 7 Lesson 26 - Surface Area

<b>Standard Benchmark and Indicator</b>
<b>S02. Measurement</b>
F. Analyze and explain what happens to area and perimeter or surface area and volume when the dimensions of an object are changed. (05-07)
09. Describe what happens to the surface area and volume of a three-dimensional object when the measurements of the object are changed; e.g., length of sides are doubled. (07)
G. Understand and demonstrate the independence of perimeter and area for two-dimensional shapes and of surface area and volume for three-dimensional shapes. (05-07)
08. Understand the difference between surface area and volume and demonstrate that two objects may have the same surface area, but different volumes or may have the same volume, but different surface areas. (07)

**Lesson 27 - Test Over Units 19 – 26**

**Lesson 28 - Variables, Formulas, and Algebraic Expressions**

Math 7 Lesson 28 - Variables, Formulas, and Algebraic Expressions

<b>Standard Benchmark and Indicator</b>
<b>S04. Patterns, Functions and Algebra</b>
D. Use symbolic algebra to represent and explain mathematical relationships. (05-07)
09. Recognize a variety of uses for variables; e.g., placeholder for an unknown quantity in an equation, generalization for a pattern, formula. (07)
G. Write, simplify and evaluate algebraic expressions. (05-07)
07. Justify that two forms of an algebraic expression are equivalent, and recognize when an expression is simplified; e.g., 4 (07)
J. Use formulas in problem-solving situations. (05-07)
08. Use formulas in problem-solving situations. (07)

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**Lesson 29 - Linear and Nonlinear Progressions, Functions, Graphing Functions, and Linear Equations**

Math 7 Lesson 29 - Linear and Nonlinear Progressions, Functions, Graphing Functions, and Linear Equations

<b>Standard Benchmark and Indicator</b>
S04. Patterns, Functions and Algebra
B. Represent, analyze and generalize a variety of patterns and functions with tables, graphs, words and symbolic rules. (05-07)
01. Represent and analyze patterns, rules and functions with words, tables, graphs and simple variable expressions. (07)
02. Generalize patterns by describing in words how to find the next term. (07)
E. Use rules and variables to describe patterns, functions and other relationships. (05-07)
03. Recognize and explain when numerical patterns are linear or nonlinear progressions; e.g., 1, 3, 5, 7... is linear and 1, 3, 4, 8, 16... is nonlinear. (07)
F. Use representations, such as tables, graphs and equations, to model situations and to solve problems, especially those that involve linear relationships. (05-07)
05. Represent linear equations by plotting points in the coordinate plane. (07)
G. Write, simplify and evaluate algebraic expressions. (05-07)
01. Represent and analyze patterns, rules and functions with words, tables, graphs and simple variable expressions. (07)
K. Graph linear equations and inequalities. (05-07)
05. Represent linear equations by plotting points in the coordinate plane. (07)

**Lesson 30 - One Step Equations**

Math 7 Lesson 30 - One Step Equations

<b>Standard Benchmark and Indicator</b>
S04. Patterns, Functions and Algebra
H. Solve linear equations and inequalities symbolically, graphically and numerically. (05-07)
04. Create visual representations of equation-solving processes that model the use of inverse operations. (07)
I. Explain how inverse operations are used to solve linear equations. (05-07)
04. Create visual representations of equation-solving processes that model the use of inverse operations. (07)

**Lesson 31 - Two Step Equations, Inequalities**

Math 7 Lesson 31 - Two Step Equations, Inequalities

<b>Standard Benchmark and Indicator</b>

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S04. Patterns, Functions and Algebra
F. Use representations, such as tables, graphs and equations, to model situations and to solve problems, especially those that involve linear relationships. (05-07)
06. Represent inequalities on a number line or a coordinate plane. (07)
I. Explain how inverse operations are used to solve linear equations. (05-07)
04. Create visual representations of equation-solving processes that model the use of inverse operations. (07)
K. Graph linear equations and inequalities. (05-07)
06. Represent inequalities on a number line or a coordinate plane. (07)

**Lesson 32 - Graphs**

Math 7 Lesson 32 - Graphs

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A. Read, create and use line graphs, histograms, circle graphs, box-and-whisker plots, stem-and-leaf plots, and other representations when appropriate. (05-07)
01. Read, create and interpret box-and-whisker plots, stem-and-leaf plots, and other types of graphs, when appropriate. (07)
E. Collect, organize, display and interpret data for a specific purpose or need. (05-07)
02. Analyze how decisions about graphing affect the graphical representation; e.g., scale, size of classes in a histogram, number of categories in a circle graph. (07)
G. Evaluate conjectures and predictions based upon data presented in tables and graphs, and identify misuses of statistical data and displays. (05-07)
02. Analyze how decisions about graphing affect the graphical representation; e.g., scale, size of classes in a histogram, number of categories in a circle graph. (07)

**Lesson 33 - Analyzing Data With Graphs, Sampling**

Math 7 Lesson 33 - Analyzing Data With Graphs, Sampling

<b>Standard Benchmark and Indicator</b>
S05. Data Analysis and Probability
B. Interpret data by looking for patterns and relationships, draw and justify conclusions, and answer related questions. (05-07)
04. Construct opposing arguments based on analysis of the same data, using different graphical representations. (07)
D. Compare increasingly complex displays of data, such as multiple sets of data on the same graph. (05-07)
05. Compare data from two or more samples to determine how sample selection can influence results. (07)
E. Collect, organize, display and interpret data for a specific purpose or need. (05-07)
02. Analyze how decisions about graphing affect the graphical representation; e.g., scale, size of classes in a histogram, number of categories in a circle graph. (07)
G. Evaluate conjectures and predictions based upon data presented in tables and graphs, and identify misuses of statistical data and displays. (05-07)
06. Identify misuses of statistical data in articles, advertisements, and other media. (07)

**Lesson 34 - Statistics, Box-and-Whiskers Plots**

Math 7 Lesson 34 - Statistics, Box-and-Whiskers Plots

<b>Standard Benchmark and Indicator</b>
S05. Data Analysis and Probability
A. Read, create and use line graphs, histograms, circle graphs, box-and-whisker plots, stem-and-leaf plots, and other representations when appropriate. (05-07)
01. Read, create and interpret box-and-whisker plots, stem-and-leaf plots, and other types of graphs, when appropriate. (07)

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03. Analyze a set of data by using and comparing combinations of measures of center (mean, mode, median) and measures of spread (range, quartile, interquartile range), and describe how the inclusion or exclusion of outliers affects those measures. (07)
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**Lesson 35 - Probability**

Math 7 Lesson 35 - Probability

Standard Benchmark and Indicator
S05. Data Analysis and Probability
I. Describe the probability of an event using ratios, including fractional notation. (05-07)
07. Compute probabilities of compound events; e.g., multiple coin tosses or multiple rolls of number cubes, using such methods as organized lists, tree diagrams and area models. (07)
K. Make and justify predictions based on experimental and theoretical probabilities. (05-07)
08. Make predictions based on theoretical probabilities, design and conduct an experiment to test the predictions, compare actual results to predicted results, and explain differences. (07)

**Lesson 36 - Second Semester Test**