

MATH Connections Correlation to the Utah Core Standards

Correlation Key:
"X" Coverage = Secondary concept of the activity or problem. Students gain a basic understanding or introduction of the concept.
"XX" In-depth coverage = Primary concept that is the focus of the activity or problem. Students gain thorough understanding of the concept.

	MATH Connections 1A				MATH Connections 1B				MATH Connections 2A			MATH Connections 2B			MATH Connections 3A				MATH Connections 3B			
	Chapter 1	Chapter 2	Chapter 3	Chapter 4	Chapter 5	Chapter 6	Chapter 7	Chapter 8	Chapter 1	Chapter 2	Chapter 3	Chapter 4	Chapter 5	Chapter 6	Chapter 1	Chapter 2	Chapter 3	Chapter 4	Chapter 5	Chapter 6	Chapter 7	Chapter 8

All secondary students in Utah will engage in the following types of activities in their study of mathematics.

Problem Solving

1. Select and use appropriate methods for computing, e.g., mental computation, estimation, paper and pencil, and calculator or computer.	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
2. Propose, critique, and value alternative approaches to solving problems.	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
3. Extend mathematical knowledge by considering the thinking strategies of others.	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
4. Reflect and evaluate mathematical thinking processes used in solving problems.	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
5. Utilize different problem solving strategies including:																						
a. Drawing a picture or diagram.	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
b. Looking for a pattern.	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
c. Identifying counterexamples.	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
d. Choosing an appropriate operation.	X	XX	XX	XX	XX	XX	XX	X	XX	XX	X	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	
e. Guessing and checking.	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
f. Making a list, table, graph, or equation.	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
g. Working backwards.	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
h. Eliminating possibilities.	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
i. Making a model or simulation.	XX	X	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
j. Solving a simpler or related problem.	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
k. Checking the reasonableness of results.	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
l. Using proportional reasoning.									XX	XX												

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	6. Develop clarification and understanding of new mathematical concepts, processes, and vocabulary by reflecting upon and answering such questions as:																						
a. What made you think of that?	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
b. Did anyone think about this in a different way?	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
c. How are these ideas related?	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
d. Where have we seen a problem like this before?	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
e. How does today's work relate to what we have done in earlier units of study?	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
7. Solve a variety of multi-step, non-routine, complex problems including puzzles, applications, patterning, and open-ended or extended problem-solving projects.	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
8. Estimate solutions to problems and determine the reasonableness of answers by relating them to the estimates.	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
Reasoning and Proof																							
1. Link problem solving to the sequence of steps in a proof and draw reasonable conclusions.										XX	XX	XX	XX								XX	XX	XX
2. Explain and justify problem-solving procedures.	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
3. Examine patterns and note regularities and irregularities in various types of problems.	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
4. Make and investigate mathematical conjectures.	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX

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	5. Formulate counterexamples.	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
6. Use a variety of formal and informal proofs appropriate to the course.		X			X				XX	XX	XX	XX	XX							XX	XX	XX
7. Identify information as necessary, sufficient, or extraneous and conclusions as valid or invalid.	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
8. Realize that observing a pattern and stating a conjecture related to the pattern does not constitute a proof.												XX	XX							XX	XX	XX
Communication																						
1. Express mathematical ideas coherently and clearly to peers, teachers, and others.	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
2. Employ the precise language and notation of mathematics to clearly express mathematical ideas.	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
3. Organize and consolidate mathematical thinking using communication methods, e.g., class and group discussion, journals, portfolios, oral presentations, and written reports.	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
Connections																						
1. Formulate real-world situations that require extended investigations, solve them, and justify answers.	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
2. Establish connections among mathematical expressions, physical models, pictorial representations, and real-world situations.	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX

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	3. Find applications of mathematical concepts in newspapers, magazines, television, radio, or other sources.	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
4. Explore historical and multicultural contributions to mathematics.		X		X	X			X	X			XX				X		XX	XX	XX	XX	XX
5. Recognize and apply mathematical ideas and relationships in areas outside the mathematics classroom, e.g., art, science, other curricular areas, and everyday life.	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
Representation																						
1. Use a variety of visual representations (e.g., patty paper, dot paper, graph paper, models, manipulatives, nets, and technology) to explore and formulate conjectures related to mathematical concepts being studied.	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
2. Represent mathematical concepts using physical models, visualizations, and appropriate symbolic notations.	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
3. Representation problem situations verbally, numerically, graphically, geometrically, or algebraically.	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
Pre-Algebra (7-12)																						
Standard 1: Students will acquire number sense and perform operations with rational numbers.																						
Objective 1: Compute fluently and make reasonable estimates.																						
1. Compute using selected methods from among mental arithmetic, estimation, paper and pencil, and calculator.	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
2. Add, subtract, multiply, and divide integers.	XX	XX	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

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3. Check the reasonableness of results using estimation.	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
4. Justify the steps used in solving problems using correct notation.	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
Objective 2: Represent rational numbers in a variety of ways.																						
1. Recognize and create equivalent forms of a rational number.		X	XX	X	X	X		X	X	X	X										XX	
2. Find an approximate location of a rational number on a number line.	XX		XX																			XX
3. Find a rational number between any two rational numbers.		X	X	XX	X																	XX
4. Choose appropriate and convenient forms of rational numbers for solving problems and representing solutions.		X	XX	X	X	X		X	X	X	X											XX
5. Represent very large and very small numbers using scientific notation.		XX																				
Objective 3: Identify relationships among rational numbers and operations involving these numbers.																						
1. Compare and order rational numbers.	XX		X		X																XX	XX
2. Identify the effects of arithmetic operations among fractions, decimals, percents, and integers; e.g., multiplying or dividing by a number larger or smaller than 1.	XX		XX			X			XX	XX											XX	
3. Recognize and use the special multiplication properties of zero.		XX	X		X																XX	
4. Recognize that division by zero is not defined.		XX	XX																		XX	

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5. Recognize and use the inverse relationships of addition and subtraction, multiplication and division, and perfect square roots and squares.		XX	X	X	X	X			X	X	X	X	X	X	X	X	X		X	XX	X	
6. Add or multiply numbers using the Commutative and Associative Properties of Addition or Multiplication.		XX	XX		XX		X						X	XX						XX		
Objective 4: Solve problems involving rational numbers using addition, subtraction, multiplication, and division.																						
1. Recognize absolute value of a rational number as the value of its distance from zero.	XX														XX							
2. Evaluate numerical and algebraic expressions containing absolute value.	XX														XX							
3. Compute with percents, including those greater than 100% and less than 1%.		XX	X					XX	XX	XX		XX			X	XX						
4. Solve problems using simple proportions.			X					XX	XX	XX		XX			X			XX				
Standard 2: Students will represent and analyze mathematical situations and properties using patterns, relations, functions, and algebraic symbols.																						
Objective 1: Use patterns, relations, and functions to represent mathematical situations.																						
1. Represent a variety of relations and functions using tables, graphs, manipulatives, verbal rules, or algebraic rules.		XX	XX	XX	X	XX			XX	XX	XX	XX			XX	XX	XX		XX	X	XX	
2. Describe simple patterns using a mathematical rule or algebraic expression .		XX	XX	XX	XX	XX	XX		XX	XX	XX	XX	XX	X	XX	XX	XX	XX	XX	XX	XX	XX

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3. Create and extend simple numeric and visual patterns, including those that have a recursive nature (e.g., Fibonacci numbers, triangular and square numbers).						XX															XX	
Objective 2: Represent, solve, and analyze mathematical situations and properties using algebraic symbols.																						
1. Evaluate algebraic expressions when given values for the variable(s).		XX	X	X	X	XX	X		XX		X		X		XX	XX	XX					
2. Identify the horizontal and vertical intercepts of a linear relation from a graph or table.			XX	XX	XX										X						XX	
3. Determine the slope of a linear relation from a graph or ordered pairs.			XX	XX	XX	XX					X									X		
4. Solve one- and two-step single-variable equations and inequalities.		XX	XX	XX	XX	XX			XX	XX		XX			XX					XX		
Objective 3: Represent quantitative relationships using mathematical models and symbols.																						
1. Create a table, graph, or algebraic expression to represent the relationship between two variables.		XX	XX	XX	XX	XX			XX	XX	XX	XX	XX		XX	XX	XX	X	XX	XX	XX	
2. Graph ordered pairs of rational numbers on a rectangular coordinate system .			XX	XX	XX	XX			XX	XX	XX	XX	XX	XX	XX	XX	XX	X	XX		XX	
3. Identify approximate rational coordinates when given the graph of a point on a rectangular coordinate system.			XX	XX	XX				X	X	XX	XX	X	X	XX	X		XX	XX	X	X	
4. Model real-world problems using various representations, such as graphs, tables, equations, manipulatives, and pictures.		XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
5. Identify information as pertinent or extraneous within the context of the original problem.	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX

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1. Estimate measurable quantities in both standard and metric units, e.g., a vase holds a little less than a quart or about a liter; a 10K run is about 6 miles.		XX	XX			XX			XX						XX							
2. Convert from one unit of measure to an equivalent unit of measure using a given conversion factor, e.g., 60 miles/hour 1 hour/3600 sec 5280 ft/1mile = 88 ft/sec.		XX	XX			XX				XX						XX						
3. Measure angles, perimeter, area, and volume using the correct size and type of units.									XX	XX	XX	XX	XX			XX						
Objective 2: Determine measurements using appropriate techniques, tools, and formulas.																						
1. Determine an approximate distance between two points using map scales.										XX			XX									
2. Solve problems involving scale factors using ratios and proportions.									XX	XX	XX	XX										
3. Solve problems involving rates and derived measures , e.g., miles per hour, kilometers per liter, cubic feet.		XX	XX	XX	XX	XX			XX	XX	XX	XX	XX	XX	XX				XX			
4. Measure inaccessible heights or distances using similar triangles.										XX	XX	XX	XX					XX				
5. Calculate surface area and volume of right prisms and cylinders using appropriate units.													XX									
6. Develop formulas for calculating the circumference of circles and the areas of triangles, parallelograms, and trapezoids.									XX	XX		XX										

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7. Calculate the circumference of circles and the areas of triangles, parallelograms, and trapezoids using formulas.									XX	XX		XX	XX										
Standard 5: Students will draw conclusions using concepts of probability after collecting, organizing, and analyzing a data set.																							
Objective 1: Formulate and answer questions by collecting, organizing, and analyzing data.																							
1. Conduct a survey or experiment to collect data.	XX						XX																
2. Organize and display data using graphical representations such as line plots, bar graphs, stem-and-leaf plots, histograms, scatter plots, circle graphs, box plots (box-and-whisker plots) , and pictographs.	XX		XX	XX	XX		XX				X			XX	XX	XX	XX						
3. Make conjectures from a graphical representation.	XX		XX	XX	XX	XX	XX							XX	XX	XX	XX						
4. Calculate the mean, median, mode, and range for a data set.	XX			XX	X		XX				X												
5. Choose a measure of central tendency most appropriate to analyze a particular set of data.	XX							X															
6. Describe how an individual data point may affect the measures of central tendency.	XX							XX										X					
7. Interpret and describe the spread of a set of data, e.g., range, box plot (box-and-whisker).	XX							XX	X			X						X					
8. Make predictions and describe the limitations of the predictions when using data samples.	XX			XX	XX			X										XX					

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9. Evaluate reported inferences or predictions based on a data set.	XX			XX	XX			XX										XX				
Objective 2: Apply basic concepts of probability.																						
1. Conduct experiments to approximate the probability of simple events.								XX										XX				
2. Recognize that results of an experiment more closely approximate the actual or theoretical probability of an event as the number of trials increases.								XX										XX				
3. Derive the probability of an event mathematically, e.g., building a table or tree diagram, creating an area model, making a list, or using the basic counting principle.								XX										XX				
4. Represent the probability of an event as a fraction, percent, ratio, or decimal.								XX										XX				
5. Identify mutually exclusive events .																		XX				
6. Recognize that the sum of the probability of an event and the probability of its complement is equal to one.																		XX				
7. Determine whether a game or process is fair.								XX										XX				
Elementary Algebra (9-12)																						
Standard 1: Students will acquire number sense and perform operations with real numbers.																						
Objective 1: Compute fluently and make reasonable estimates.																						
1. Estimate solutions to problems.	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
2. Compute solutions to problems.	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX

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3. Determine the reasonableness of an answer by relating it to the problem.	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
Objective 2: Represent real numbers in a variety of ways.																							
1. Compare and order real numbers .	XX		X		XX																XX	XX	
2. Choose appropriate and convenient forms of real numbers for solving problems and representing answers, e.g., radical form, multiples of pi, decimal, fraction, or percent.	XX	X	XX	X	X	X		XX	XX	X	XX	XX	XX	X	X	XX	XX	XX	X			XX	
Objective 3: Identify relationships among real numbers and operations involving these numbers.																							
1. Classify numbers as rational or irrational in the real number system.	X				X																X	XX	
2. Relate properties and operations of rational numbers to irrational numbers .																					XX	XX	
3. Simplify numerical expressions and solve problems using real numbers.		XX	X	X	X	XX	X	X	XX	XX	XX	XX	X	X	XX	XX	XX	XX	XX	X	X		
Standard 2: Students will represent and analyze mathematical situations and properties using patterns, relations, functions, and algebraic symbols.																							
Objective 1: Use patterns, relations, and functions to represent mathematical situations.																							
1. Write algebraic expressions or equations to generalize visual patterns, numerical patterns, relations, data sets, or scatter plots .		XX	XX	XX	XX	XX			XX	XX	XX	XX	XX		XX	XX	XX					XX	
2. Represent linear equations in slope-intercept form, $y = mx + b$, or standard form, $ax + by = c$.			XX	XX	XX	XX			X		X	X	XX	XX					XX				
3. Distinguish between linear and non-linear functions or equations by examining a table, equation, or graph.		XX	XX	XX	XX	XX			X		XX	XX			XX	XX	XX						

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4. Identify the slope of a linear function as an average rate of change in real-world situations.		XX	XX	XX	XX	XX			XX						XX				XX			
Objective 2: Evaluate, solve, and analyze mathematical situations using algebraic properties and symbols.																						
1. Solve real-world problems involving constant rates of change, e.g., rates of travel, hourly wages, or rates of interest.		XX	XX	XX	XX	XX			XX					XX	XX	XX	XX		XX			
2. Solve multi-step equations and inequalities:		XX	XX	XX	XX	XX			XX	X	XX	XX	XX	XX	XX				XX	XX	XX	
a. Numerically; e.g., from a table or guess and check.		XX	XX	XX	XX	XX	X		X			X		XX	X	X			X			
b. Algebraically, including the use of manipulatives.		XX	XX	XX	XX	XX	X		XX	X	XX	XX	XX	XX	XX	XX	XX		XX	XX	XX	
c. Graphically.			XX	XX	XX	XX			XX	XX		XX		XX	XX	XX	XX		XX		X	
d. Using technology.			XX	XX	XX	XX			XX	XX		XX		XX	XX	XX	XX		XX		XX	
3. Solve systems of two linear equations or inequalities:		X	X		XX									XX					XX			
a. Numerically; e.g., from a table or guess and check.		X	X		XX									XX					XX			
b. Algebraically.		X	X		XX									XX					XX			
c. Graphically.			X		XX									XX					XX			
d. Using technology.			X		XX									XX					XX			
4. Determine the number of possible solutions for a system of two linear equations.					XX									XX					XX			
5. Evaluate numerical expressions (including exponents and square roots), algebraic expressions, formulas, and equations.	XX	XX	X	X	X	XX			XX	X	X	XX	XX	XX	XX	XX	X	X	XX	X	X	

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	Chapter 1	Chapter 2	Chapter 3	Chapter 4	Chapter 5	Chapter 6	Chapter 7	Chapter 8	Chapter 1	Chapter 2	Chapter 3	Chapter 4	Chapter 5	Chapter 6	Chapter 1	Chapter 2	Chapter 3	Chapter 4	Chapter 5	Chapter 6	Chapter 7	Chapter 8
	6. Solve linear formulas and literal equations for a specified variable, e.g., solve for p in $I = prt$.					XX									XX					XX	X	
7. Simplify algebraic expressions, including those having integer exponents.		XX	X	X	X	XX	X		XX	XX		X	X	XX	XX	XX	X	X	XX	X	X	
8. Solve proportions that include algebraic first-degree expressions.			XX						XX	XX										XX		
9. Determine the number of solutions for a system of linear equations.					XX									XX					XX			
Objective 3: Represent quantitative relationships using mathematical models and symbols.																						
1. Identify the slope of a line when given:																						
a. A set of two ordered pairs .			XX	XX	XX	XX				XX	XX			X	XX				XX			
b. An equation of a linear function.			XX	XX	XX	XX				XX	XX			X	XX				XX			
c. The graph of a linear function.			XX	XX	XX	XX				XX	XX			X	XX				XX			
d. A table of values.			XX	XX	XX	XX				XX	XX			X	XX				XX			
2. Write the equation of a line when given:																						
a. A set of ordered pairs.			XX	XX	XX	XX				XX	XX			X	XX				XX			
b. The slope and a point on the line.			XX	XX	XX	XX				XX	XX			X	XX				XX			
c. The graph of a line.			XX	XX	XX	XX				XX	XX			X	XX				XX			
3. Identify horizontal and vertical lines given the equations.			XX			XX													XX			
4. Identify the domain and range of a relation or function from a graph, equation, table, or set of ordered pairs.						XX									XX	XX	XX					
5. Determine the effect of parameter changes on the graphs of linear relations.			XX			XX			XX						XX							
6. Determine whether two lines are parallel, perpendicular, or neither, given the equations.			XX		X					XX				XX								

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7. Determine the x- and y- intercepts from an equation or graph of a line.			XX			XX							X								XX			
8. Graph linear functions:																								
a. By plotting points.			XX	XX	XX	XX			X	X		X		XX	XX						XX			
b. By finding x- and y- intercepts .			XX		X	XX				X					X						XX			
c. Using the slope- intercept form of a line.			XX	XX	XX	XX			X	X				XX	XX						XX			
d. Using the slope and any point on the line.			XX	XX	XX	XX			X	X				XX	XX						XX			
9. Graph linear inequalities and identify the boundary line and solution area .			X																		XX			
10. Determine and explain the meaning of intercepts using real-world examples.			XX	XX	XX	XX								XX	XX						XX			
11. Use direct variation to model rates of change, e.g., if income = 40 hours times rate of pay, then increasing the rate of pay increases income.			X						XX	XX														

Standard 3: Students will solve problems using spatial and logical reasoning, applications of geometric principles, and modeling.

Objective 1: There is no Objective 1 for this standard.

Objective 2: Specify locations and describe spatial relationships using coordinate geometry.

1. Find the distance between two given points and find the coordinates of the midpoint between them.										XX	XX	XX	XX	XX										XX	
2. Solve problems using the distance formula.										XX	XX	XX	XX	XX										XX	
3. Solve problems for areas, perimeters, volumes, and surface areas using formulas.										XX	XX		XX	XX		XX						XX			

Objective 3: Solve problems using visualization, spatial reasoning, and geometric modeling.

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1. Solve problems using the Pythagorean Theorem .									XX	XX	XX	XX	XX										
2. Find missing parts of geometric figures using proportional reasoning and geometric relationships.										XX	XX	XX	XX										XX
3. Illustrate multiplication of polynomials using area models, e.g., $(a + b)^2$, $x(x + 2)$, or $(x + a)(x + b)$.									XX						XX								
4. Factor polynomials using area models:									X						XX								
a. To identify the greatest common monomial factor.									X						X								
b. Of the form $ax^2 + bx + c$ when $a = 1$.															XX								
Standard 4: Students will understand and apply measurement tools, formulas, and techniques.																							
Objective 1: Understand measurable attributes of objects and the units, systems, and processes of measurement.																							
1. Solve problems and express answers using appropriate units of measure.		XX	X	X	X	XX			X	X	XX	X	X	X	XX	XX	XX		XX				
2. Express the rate of change as a ratio of two different measures.		XX	XX	XX	XX	XX			XX	XX	X				XX	XX	XX		XX				
3. Select appropriate units to achieve the desired precision when solving problems.		XX				XX			XX														
Standard 5: Students will draw conclusions using concepts of probability after collecting, organizing, and analyzing a data set.																							
Objective 1: Formulate and answer questions by collecting, organizing, and analyzing data.																							
1. Collect, record, organize, and display a set of data.	XX							XX				X											
2. Determine whether the pattern of the data is linear or nonlinear when given in a list, table, or graph.		X	XX	X		X					X				XX	XX	X		X				
3. Interpret the correlation between two variables as being positive , negative , or having no correlation .				X	XX																		

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4. Find a line of best fit by estimation, choosing two points, or using technology for a given set of data.				XX	XX							X			X	X						
5. Analyze the meaning of the slope and y-intercept of a line of best fit as it relates to the data.				XX	XX							X			XX	XX			XX			
6. Make predictions based on a line of best fit.				XX	XX							X			X	X						
Objective 2: Apply basic concepts of probability.																						
1. Determine and express the probability of an event as a fraction, percent, ratio, or decimal.								XX										XX				
2. Identify the probability of an event as being between zero (event not possible) and one (event certain).								XX										XX				
3. Recognize that the sum of the probability of an event and the probability of its complement is equal to one.								XX										XX				
4. Determine whether a game or process is fair.								XX										XX				
Geometry (8-12)																						
Standard 1: Students will acquire number sense and perform operations with real numbers.																						
There were no new extensions of the number system or number operations introduced in Geometry.																						
Standard 2: Students will represent and analyze mathematical situations and properties using patterns, relations, functions, and algebraic symbols.																						
Objective 1: Use patterns, relations, and functions to represent mathematical situations.																						
1. Identify trigonometric relationships (sine, cosine, and tangent) using right triangles, expressing the relationships as fractions or decimals.												XX						XX				

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3. Prove a statement false by using a counterexample .									XX	XX		XX	XX						XX	XX		XX
4. Identify angle pairs as adjacent, complementary, supplementary, a linear pair, or vertical angles .										XX		X										
5. Differentiate between parallel, perpendicular, skew , and intersecting lines.										XX			XX	XX								
6. Classify angle pairs formed by two lines and a transversal , e.g., corresponding, alternate interior, and supplementary angles.										XX												
7. Prove lines parallel or perpendicular using slope or angle relationships.			X							XX			XX									XX
8. Prove congruency and similarity of geometric figures.										XX	XX											XX
9. Identify medians, altitudes, and angle bisectors of a triangle, and the perpendicular bisectors of the sides of a triangle.										XX			X									
10. Classify a quadrilateral as a parallelogram, trapezoid, rectangle, square, rhombus, kite , or none of the above.									XX	X										XX		
11. Identify radii, diameters, chords, secants, arcs, sectors, central angles, inscribed angles, and tangents for circles.												XX	X									
12. Classify and use the properties of acute, right, scalene, oblique, isosceles, equilateral, or equiangular triangles.									X	XX	XX	X	X							XX		
13. Classify polyhedrons and other three-dimensional figures according to their properties.													XX							XX		

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Objective 2: Specify locations and describe spatial relationships using coordinate geometry.																						
1. Graph a circle given the equation in the form $(x - h)^2 + (y - k)^2 = r^2$.													X									
2. Write the equation of a circle given its graph.													XX									
3. Verify the classifications of geometric figures using coordinate geometry to find lengths and slopes, e.g., verify or prove the diagonals of a rectangle are congruent using the distance formula.									X	XX										XX		
4. Perform and analyze transformations (translations, rotations, reflections, and dilations) using coordinate geometry.													XX									
Objective 3: Use visualization, spatial reasoning, and geometric modeling to solve problems.																						
1. Construct/copy angles and segments, bisect angles and segments, and create perpendicular lines and parallel lines using a compass and straight edge, technology, or other manipulatives.									XX	XX		X										
2. Define pi as the ratio of the circumference to the diameter of a circle.												XX										
3. Identify the relationships between the measures of intercepted arcs and inscribed or central angles .												XX										
4. Solve real-world problems using trigonometric ratios and properties of congruent and similar figures, e.g., "How much paint is needed to paint a room?" or "How can we ensure square corners in a building during construction?"									XX	XX	XX	XX	XX		XX					XX		
5. Sketch cross-sections of geometric solids.													XX									X

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Objective 2: Represent complex numbers in a variety of ways.

1. Extend the number system to include complex numbers in the form $a + bi$.																						
2. Identify the need for the square root of a negative number and define the imaginary number $i = \sqrt{-1}$		X																			XX	X
3. Simplify expressions involving radical expressions including square roots of negative numbers.																X						

Objective 3: Identify relationships among real numbers and operations involving these numbers.

1. Identify matrices that can be added, subtracted, or multiplied.																						XX
2. Demonstrate that matrix multiplication is not commutative .																						XX
3. Identify additive and multiplicative identities and inverses of a matrix when they exist.																						X

Standard 2: Students will represent and analyze mathematical situations and properties using patterns, relations, functions, and algebraic symbols.

Objective 1: Use patterns, relations, and functions to represent mathematical situations.

1. Compare and contrast relations and functions.						XX										XX	XX	XX				
2. Identify the domain and range of the absolute value, quadratic, radical, sine, and cosine functions.						XX										XX	XX	XX				
3. Use function notation.						XX										XX	XX	XX	XX			
4. Find the compositions or combinations of two simple functions.						XX										X						
5. Find the inverse of a function by interchanging the values of domain and range, reflecting across the line $y = x$, or by using algebra.																XX	XX	XX				

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6. Relate the sine, cosine, tangent, cosecant, secant, and cotangent to the unit circle.											XX						XX					
7. Express angle measure in degrees or radians when given the trigonometric value.										X	XX						XX					
Objective 2: Evaluate, solve, and analyze mathematical situations using algebraic properties and symbols.																						
1. Solve quadratic equations.		X					X		X								XX					
2. Solve first-degree absolute value equations.	X																XX					
3. Solve radical equations including those with extraneous roots.																	XX					
4. Solve single-variable quadratic and absolute value inequalities.	X																X				X	
5. Write a quadratic equation when given the rational roots or zeroes of the function.																	XX					
6. Solve systems of equations with no more than three variables using technology.					XX												XX				XX	
7. Solve and graph systems of linear inequalities.		X	X		XX												XX				XX	
8. Add, subtract, multiply, and divide simple rational expressions and solve simple rational equations .		XX							XX	XX							XX					
9. Recognize that a^{-n} is defined as the reciprocal of a^n , i.e., $a^{-n} = \frac{1}{a^n} \text{ if } a \neq 0$		XX															XX					

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	10. Recognize that rational exponents are used to represent radicals, i.e., $a^{\frac{p}{q}} = \sqrt[q]{a^p} = (\sqrt[q]{a})^p \text{ if } a > 0$		X														XX					
11. Represent intervals with correct symbolic notation; e.g., $a < x < b$, (a, b) , $[a, b]$.		XX											XX						XX	XX		
Objective 3: Represent quantitative relationships using mathematical models and symbols.																						
1. Interpret rates of change by analyzing graphical and numerical data for quadratic and radical functions.																XX	XX					
2. Find the vertex , maximum or minimum values, intercepts , and axis of symmetry of a quadratic or absolute value function, algebraically, graphically, and numerically.									X							XX						
3. Write the equation of a parabola in the form $y = a(x - h)^2 + k$ and a circle in the form $(x - h)^2 + (y - k)^2 = r^2$ by completing the square.																XX						
Standard 3: Students will solve problems using spatial and logical reasoning, applications of geometric principles, and modeling.																						
There is no Objective 1 for this standard.																						
Objective 2: Specify locations and describe spatial relationships using coordinate geometry.																						
1. Sketch the graph of a quadratic and absolute value function.			X													XX						
2. Sketch the solutions of absolute value and quadratic inequalities of one variable on a number line.	X															X				XX		
3. Sketch the solutions of absolute value and quadratic inequalities of two variables on a Cartesian coordinate system.																XX						

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4. Sketch the graph of a square root function.															X	XX							
5. Write an equation of a parabola in the form $y = a(x - h)^2 + k$ when given a graph.															XX								
6. Graph sine and cosine functions.			X														XX						
7. Perform the transformations of stretching, shifting, and reflecting the graphs of linear, absolute value, quadratic, and radical functions.			XX												XX	XX	XX						
8. Perform transformation on the sine and cosine functions involving amplitude, period, phase shift , vertical shift, and reflections.																	XX						
Objective 3: Solve problems using visualization, spatial reasoning, and geometric modeling.																							
1. Solve problems involving absolute value and quadratic functions algebraically and graphically.															XX								
2. Solve problems using graphs of sine and cosine functions.																	XX						
Standard 4: Students will understand and apply measurement tools, formulas, and techniques.																							
Objective 1: Understand measurable attributes of objects and the units, systems, and processes of measurement.																							
1. Convert angle measurements between radians and degrees.																	XX						
2. Calculate the exact values of the sine, cosine, and tangent functions for the special angles of the unit circle.										XX							XX						
Objective 2: Determine measurements using appropriate techniques, tools, and formulas.																							
1. Find the length of an arc using radian measure.																	XX						
2. Find the area of a sector in a circle using radian measure.																	XX						
Standard 5: Students will draw conclusions using concepts of probability after collecting, organizing, and analyzing a data set.																							

