

**GLENCOE CORRELATION**  
**MATHEMATICS CONNECTIONS**  
 NEW MEXICO  
 Mathematics Performance Standards  
 Grades 9-12

STANDARDS	LESSON REFERENCES
<b>CONTENT STANDARD 1: UNIFYING CONCEPTS AND PROCESSES</b> <b>STUDENTS WILL UNDERSTAND AND USE MATHEMATICS IN PROBLEM SOLVING</b>	
<b>A. Analyze problem-solving approaches to investigate and understand mathematical content.</b>	
1. Clarify the strategy involved in solving given problems by breaking complex problems into similar parts.	8-7, 9-5, 9-6, 10-3, 10-7, 10-8, 10-10
2. Adapt previously used strategies to new problems.	10-5, 10-6, 10-7, 10-8, 10-9, 10-10
<b>B. Formulate problems from global mathematical situations.</b>	
1. Identify mathematical implications of real-world situations.	10-10, 11-7, 12-2, 12-3
2. Formulate appropriate problems involving these situations.	10-10, 11-7, 12-2, 12-3
3. Apply previously developed strategies to solve these problems.	10-10, 11-7, 12-2, 12-3
<b>C. Select the best strategies to solve a wide variety of problems in diverse contexts.</b>	
1. Use a variety of mathematical models such as tables, graphs, and algebraic expressions to represent real-world problems.	11-2, 11-4, 11-5, 11-6, 11-7, 11-8, 11-10
2. Apply a variety of reasoning processes to solve problems.	1-6, 1-7, 1-8, 2-7, 2-9, 3-6, 4-14, 11-11, 12-7
3. Evaluate the validity of arguments and the efficiency of chosen strategies.	1-8, 2-7, 3-6, 4-14, 5-5, 6-6, 7-10, 8-6, 9-10, 11-3, 11-11, 12-7
<b>D. Verify and interpret results with respect to the original problem situation.</b>	
1. Check to see that the solution of a problem is reasonable, and justify the solution verbally or in writing.	1-7, 2-1, 7-10, 9-10, 10-5, 11-3
<b>E. Use manipulatives, calculators, computers, and other tools, as appropriate, in order to strengthen mathematical thinking, understanding, and power to build upon foundational concepts.</b>	
1. Use appropriate tools (e.g., manipulatives, calculators, and computers) to demonstrate mathematical properties and relationships from numeric, algebraic, and geometric perspectives.	1-2, 1-9, 1-10, 2-4, 3-11, 8-4, 9-9, 12-3

STANDARDS	LESSON REFERENCES
<b>F. <i>Analyze solutions and strategies for use in mathematical modeling.</i></b>	
1. Describe and analyze mathematical situations in a variety of ways including orally, pictorially, graphically, in writing, and with concrete materials and algebraic expressions.	1-3, 1-5, 1-11, 2-7, 8-1, 8-2, 9-5
<b>CONTENT STANDARD 2: UNIFYING CONCEPTS AND PROCESSES STUDENTS WILL UNDERSTAND AND USE MATHEMATICS IN COMMUNICATION</b>	
<b>A. <i>Analyze personal mathematical thinking for validity and applicability to specific problems.</i></b>	
1. Decide how mathematics would be an aid in solving a real-life problem.	1-5, 2-5, 3-3, 4-4, 5-4, 6-11, 7-4, 8-5, 9-7, 10-9, 11-3, 12-4, 13-6, 14-5
2. Determine the best method of solution (graph, formula, logic, etc.)	1-8, 2-7, 3-6, 4-14, 5-5, 6-6, 7-10, 8-6, 9-10, 10-4, 11-11, 12-7, 13-7, 14-7
<b>B. <i>Use drawings, discussion, reading, writing, and listening to access, learn, and communicate mathematical ideas.</i></b>	
1. Express mathematical ideas in an easy-to-understand format such as drawing, discussing, listening, reading, and writing, etc., using appropriate vocabulary and notation.	1-1, 1-2, 1-11, 4-7, 6-6, 6-10
2. Ask clarifying and extending questions about mathematical ideas.	6-11, 6-12, 7-10
<b>C. <i>Select the most economical and illustrative method to communicate mathematical concepts, thoughts, and problem solutions including mathematical notation, charts, slides, graphs, maps, drawings, pictures, sound recordings, video, e-mail, and others.</i></b>	
1. Discern among the many modes of communication of mathematics to choose the most easy-to-understand, effective, or economical method.	2-7, 10-4
<b>D. <i>Analyze mathematical ideas through the use of learning tools such as manipulatives, calculators, and computers.</i></b>	
1. Use manipulatives as an aid to understanding the meaning of a problem and to suggest a mode of solution.	1-8, 3-3
2. Learn to use computers and graphing calculators to simulate situations, analyze data, and solve complicated problems in an effective way.	1-2, 1-10, 3-8, 3-11, 8-4, 9-9, 12-3
<b>E. <i>Describe the economy, power, and elegance of mathematical notation and its role in the development of mathematical ideas.</i></b>	
1. Demonstrate that translating a real-life problem to a mathematical equation results in an easier and organized method of solution.	8-3, 8-4, 11-4, 11-5, 11-6, 11-7
2. Use appropriate notation for mathematics.	1-3, 1-10, 3-4, 3-5, 3-8, 3-11

STANDARDS	LESSON REFERENCES
<b>F. <i>Read presentations of mathematics with understanding.</i></b>	
1. Be aware of how mathematics is presented in everyday publications.	14-5
2. Interpret results of graphs, statistics, etc., in daily news.	
3. Verify or refute implications and conclusions presented in news publications.	See Glencoe's <i>Algebra 1: Integration • Applications • Connections Lesson Planning Guide</i> .
<b>CONTENT STANDARD 3: UNIFYING CONCEPTS AND PROCESSES STUDENTS WILL UNDERSTAND AND USE MATHEMATICS IN REASONING</b>	
<b>A. <i>Develop and test conjectures and mathematical arguments.</i></b>	
1. Brainstorm, in a cooperative setting, possible conjectures and modes of solution to a mathematical problem.	7-10
2. Give pros and cons to test the validity and/or usefulness of such conjectures and methods of solutions.	4-3
<b>B. <i>Evaluate reasoning strategies to select the most appropriate reasoning method to solve a given problem.</i></b>	
1. Know several possible problem-solving strategies such as guess and check, develop a pattern, form an equation, etc.	1-8, 2-7, 3-6, 4-14, 5-5, 6-6, 7-10, 8-6, 9-10, 10-4, 11-11, 12-7, 13-7, 14-7
2. Analyze and choose the best of these strategies for the particular problem.	1-8, 2-7, 3-6, 4-14, 5-5, 6-6, 7-10, 8-6, 9-10, 10-4, 11-11, 12-7, 13-7, 14-7
<b>C. <i>Judge the validity of mathematical arguments.</i></b>	
1. Give a counterexample to demonstrate an invalid mathematical argument or reasons to substantiate logical valid arguments.	11-3
<b>D. <i>Construct and evaluate logical arguments.</i></b>	
1. Given an assumption, develop a logical sequence of arguments leading to a valid conclusion or solution to a problem (statement/reasons proof, informal proof, and algebraic steps).	1-2, 1-3, 1-8, 3-9, 4-1, 4-2, 4-6, 7-7
<b>E. <i>Formulate counterexamples to understand mathematical reasoning.</i></b>	
1. Give a counterexample and explain why it demonstrates that a mathematical argument was invalid and led to a false conclusion.	11-3
<b>CONTENT STANDARD 4: UNIFYING CONCEPTS AND PROCESSES STUDENTS WILL UNDERSTAND AND USE MATHEMATICAL CONNECTIONS</b>	
<b>A. <i>Relate mathematical procedures in one representation to procedures in equivalent representations.</i></b>	
1. Given a representation of a problem or data (e.g., pictorial, graph, and equation), represent it using another of these methods.	1-13, 2-7, 4-14, 8-6

STANDARDS	LESSON REFERENCES
<b>B. Compare and contrast equivalent representations of the same concept.</b>	
1. Given several different methods of representing a problem or data, students will be able to identify which representations are more useful for identifying certain information.	2-7
2. Discuss which representations are easiest to read, more economical in terms of time, give more information, etc.	2-7
<b>C. Assess the relationship among mathematical topics.</b>	
1. Use material learned in one math course or section of a course to solve problems in another area of mathematics (e.g., to solve geometry problems, students must be able solve algebraic equations.)	4-1, 4-8, 4-9, 8-1, 8-2, 8-3, 8-4, 8-5, 10-1, 10-3, 10-6
<b>D. Incorporate the use of technology into the application of mathematical reasoning and problem solving to other disciplines.</b>	
1. Use graphing calculators and/or computers in the analysis of results of experiments or population data that are important in other fields of study.	2-4, 3-3, 3-13
<b>E. Evaluate mathematical solutions for problems in daily life and in the greater society.</b>	
1. Examine the validity and usefulness of mathematics solutions being offered to problems in everyday life (e.g., environmental issues, health issues, etc.).	3-3, 4-4, 9-7
<b>CONTENT STANDARD 5: NUMBER AND OPERATION CONCEPTS STUDENTS WILL UNDERSTAND AND USE NUMBERS AND NUMBER RELATIONSHIPS</b>	
<b>A. Extend number sense skills to include irrational numbers.</b>	
1. Use models, such as number lines and Venn diagrams, to show similarities and differences among real numbers.	1-3, 1-4, 4-9, 10-4, 12-1, 12-2
<b>B. Apply number-sense skills within the real number system.</b>	
1. Compare and order members of the real number system.	1-3, 4-7, 12-1
<b>C. Apply ratios, proportions and percents in more complex mathematical situations.</b>	
1. Investigate and describe the application of ratios, proportions, and percents in real-world situations.	3-9, 9-1, 9-2, 9-3, 9-4, 9-8, 9-9, 10-1, 10-2
<b>D. Analyze and interpret numerical relationships in one- and two-dimensional graphs, both manually and using tools such as graphing calculators and computers.</b>	
1. Graph and use such tools as graphing calculators to analyze and interpret relationships.	3-4, 10-10, 11-2, 11-4, 11-5, 11-10, 13-5

STANDARDS	LESSON REFERENCES
<b>CONTENT STANDARD 6: NUMBER AND OPERATION CONCEPTS STUDENTS WILL UNDERSTAND AND USE NUMBER SYSTEMS AND NUMBER THEORY</b>	
<b>A. Use order relations within the real number system.</b>	
1. Order and compare whole numbers, fractions, decimals, integers, and rational and irrational numbers.	1-3, 4-7, 12-1
<b>B. Apply number theory concepts to a variety of problem situations.</b>	
1. Apply mathematical thinking using a variety of tools to demonstrate concepts, such as order, primes, factors, and multiples.	4-1, 4-2, 4-3
<b>C. Identify how seemingly different mathematical situations may be essentially the same (for example, the intersection of two lines is the same as the solution to a system of linear equations.)</b>	
1. Compare, translate, extend, and represent numbers in various forms such as decimal, fraction, scientific notation, patterns, graphs, charts, and tables.	2-6, 3-8, 3-9, 5-8, 5-9, 9-9
<b>D. Compare and contrast the real number system and its various subsystems with regard to structural characteristics.</b>	
1. Explain how a number system differs from a set of numbers.	12-1
<b>D. Develop and analyze algorithms.</b>	
1. Explain the four basic arithmetic operations.	1-11, 1-12
2. Describe which field properties hold for each of a variety of subsets of real numbers such as odd numbers, even numbers, prime numbers, composite numbers, powers of 2, factors of a given number, squares, and square roots.	1-2, 4-1, 4-2
<b>CONTENT STANDARD 7: NUMBER AND OPERATION CONCEPTS STUDENTS WILL UNDERSTAND AND USE COMPUTATION AND ESTIMATION</b>	
<b>A. Develop, analyze, and explain methods for solving a variety of problem situations.</b>	
1. Clarify and express orally, in writing, or by project simulation the mathematical thinking involved in solving given problems.	1-8, 2-7, 3-6, 4-14, 5-5, 6-6, 7-10, 8-6, 9-10, 10-4, 10-9, 11-11, 12-7, 13-7, 14-7
<b>B. Extend solutions of problems to formulate predictions.</b>	
1. Compare, translate, extend, and represent numbers in various forms such as decimal, fraction, scientific notation, patterns, graphs, charts, and tables.	2-6, 3-8, 3-9, 5-8, 5-9, 9-9
2. Solve an application involving optimal production and marketing decisions.	6-11, 8-5, 14-5

STANDARDS	LESSON REFERENCES
<b>C. <i>Justify the reasonableness of solutions and predictions.</i></b>	
1. Use estimation as a first step in all calculations, especially when using calculators.	1-6, 1-7, 4-9, 5-1, 10-5
2. Evaluate relationships between key components and the original problem situation to determine the reasonableness of solutions and predictions.	1-7, 2-1, 7-10, 9-10, 10-5, 11-3
<b>CONTENT STANDARD 8: GEOMETRY AND MEASUREMENT CONCEPTS STUDENTS WILL HAVE A FOUNDATION IN GEOMETRIC CONCEPTS</b>	
<b>A. <i>Interpret and draw three-dimensional objects.</i></b>	
1. Use top, front, and side views to create accurate and complete representations of three-dimensional objects.	7-9, 8-7, 8-8, 8-10, 8-11, 8-12
<b>B. <i>Deduce properties of figures using transformations and using coordinates.</i></b>	
1. Draw geometric figures on a coordinate plane.	13-5
<b>C. <i>Classify figures in terms of congruence and similarity and apply these relationships.</i></b>	
1. Explain why triangles are similar or congruent.	8-3, 9-6
2. Apply congruence and similarity to other polygons.	9-6
<b>D. <i>Represent problem situations with geometric models and apply properties of figures.</i></b>	
1. Apply right triangle trigonometry to solve a problem.	See Glencoe's <i>Algebra 1: Integration • Applications • Connections Lesson Planning Guide.</i>
<b>E. <i>Deduce properties of and relationships between figures from given assumptions.</i></b>	
1. Given assumptions about a figure, students will give formal or informal proofs regarding properties of the figure or relationships between the given figures.	7-3, 7-7, 7-10
<b>F. <i>Identify congruent and similar figures using transformations.</i></b>	
1. Understand the effect that translating, reflecting, rotating, or dilating has on a figure and use this information to identify congruencies or similarities between figures.	9-5
<b>G. <i>Analyze properties of Euclidean transformations and relate transformations to vectors.</i></b>	
1. Understand the effect that translating, reflecting, rotating, or dilating has on a figure and use this information to identify the results of transforming vectors.	7-4
2. Use vectors as tools to transform figures into congruent or similar figures.	7-4

STANDARDS	LESSON REFERENCES
<b>CONTENT STANDARD 9: GEOMETRY AND MEASUREMENT CONCEPTS STUDENTS WILL UNDERSTAND AND USE MEASUREMENT</b>	
<b>A. <i>Apply measurement as a tool in other disciplines and in everyday problem situations.</i></b>	
1. Use ratio and proportion to find distances which are difficult to measure directly, e.g., heights of buildings or flagpoles.	9-5, 9-6
2. Find volumes and surface areas of geometric solids (e.g., cones, pyramids, and prisms).	8-7, 8-8, 8-9, 8-10, 8-11, 8-12
<b>B. <i>Identify and use the appropriate units and tools of measurement to the degree of accuracy required in particular problems.</i></b>	
1. Estimate the cost of a construction job given the job's blueprints, specifications, and material and labor costs.	8-5
2. Determine if errors are within acceptable levels.	6-2, 6-4
<b>CONTENT STANDARD 10: STATISTICS AND PROBABILITY CONCEPTS STUDENTS WILL UNDERSTAND AND USE STATISTICS</b>	
<b>A. <i>Construct and draw inferences from charts, tables, and graphs that summarize data from inside and outside the school environment.</i></b>	
1. Create and interpret a scatterplot.	See Glencoe's <i>Algebra 1: Integration • Applications • Connections Lesson Planning Guide.</i>
<b>B. <i>Use curve fitting to predict from data.</i></b>	
1. Given data, students will manually or with the aid of technology find a best curve fit.	See Glencoe's <i>Algebra 1: Integration • Applications • Connections Lesson Planning Guide.</i>
2. After determining the equation of the best fit, students will apply the equation in order to predict results of what could happen at other data points.	See Glencoe's <i>Algebra 1: Integration • Applications • Connections Lesson Planning Guide.</i>
<b>C. <i>Apply measures of central tendency, variability, and correlation.</i></b>	
1. Determine the most meaningful measure of central tendency for a given situation.	11-1, 11-2, 11-3, 11-9
<b>D. <i>Define sampling and recognize its role in statistical claims.</i></b>	
1. Use sampling techniques to draw inferences about large populations.	14-7
<b>E. <i>Design an experiment to study a problem and use the correct statistical procedures to summarize and analyze the data.</i></b>	
1. Explore questions of experimental design, use of control groups, and reliability.	11-3

STANDARDS	LESSON REFERENCES
<b>F. Analyze the effects of data transformations on measures of central tendency and variability.</b>	
1. Explain what effect multiplication by a constant on a data set will have on the mean, median, mode, and standard deviation.	See Glencoe's <i>Advanced Mathematical Concepts Lesson Planning Guide</i> .
<b>CONTENT STANDARD 11: STATISTICS AND PROBABILITY CONCEPTS STUDENTS WILL UNDERSTAND AND USE PROBABILITY</b>	
<b>A. Use simulations to estimate probability.</b>	
1. Devise experiments which can be generalized to estimate the probability of a larger event.	14-5, 14-7
<b>B. Use experimental or theoretical probability to represent and solve problems involving uncertainty.</b>	
1. Organize the results of an experiment to give the best possible representation (graph, table, etc.) and use this representation as a tool to predict results and solve problems.	11-2, 14-5, 14-7
2. Use permutations and/or combinations to solve problems involving uncertainty.	14-1
<b>C. Apply the definition of a random variable to experimental design.</b>	
1. Understand the meaning of a completely random event.	14-1, 14-3, 14-4, 14-7
2. Be able to use technology to simulate a random event.	14-7
3. Devise an experiment in which a random event plays a key role.	14-7
<b>D. Create and interpret discrete probability distributions.</b>	
1. Analyze bar graphs, pie graphs, broken line graphs, etc.	11-2, 11-4, 11-5, 11-6, 11-7, 11-8, 11-10
2. Given data, create an appropriate bar graph, broken line graph, tree diagram, box and whiskers plot, etc., to display it in the best possible way.	11-2, 11-4
<b>E. Describe the normal curve and apply its properties to answer questions about data that are assumed to be normally distributed.</b>	
1. Given a normal curve, apply its properties to identify the number (or percent) of data points within one standard deviation, two standard deviations, etc.	See Glencoe's <i>Advanced Mathematical Concepts Lesson Planning Guide</i> .
<b>F. Solve enumeration and finite probability problems.</b>	
1. Apply knowledge of permutations and combinations to solve problems involving enumeration and finite probability.	14-1

STANDARDS	LESSON REFERENCES
<b>CONTENT STANDARD 12: FUNCTIONS AND ALGEBRA CONCEPTS STUDENTS WILL UNDERSTAND AND USE PATTERNS AND FUNCTIONS</b>	
<b>A. <i>Model everyday experiences with a variety of functions.</i></b>	
1. Given a realistic problem or event, describe and correctly use various functions, including linear, exponential, power, rational, square and square root, and cube and cube root.	13-1, 13-2, 13-3, 13-4, 13-5, 13-7
<b>B. <i>Represent and analyze relationships using tables, graphs, rules, and equations.</i></b>	
1. Model realistic problems or the result of experiments using a table, graph, rule, or equation.	13-1, 13-2, 13-3, 13-5, 13-6, 13-7
2. Given a table, graph, rule, or equation, analyze the meaning and apply to a realistic situation.	13-1, 13-2, 13-3, 13-5, 13-6, 13-7
<b>C. <i>Translate among tabular, symbolic, and graphical representations of functions.</i></b>	
1. Use technology, such as graphing calculators, to analyze functions and to note properties such as domain and range.	11-5
2. Given one form of function representation (table, symbol, and graph), display the information in the other two ways.	13-5
<b>D. <i>Model a variety of problem situations using the same type of function.</i></b>	
1. Determine which graphs and equations result from the following functions: linear, exponential, power, rational, square and square root, and cube and cube root.	13-5
2. Given a type of function, formulate a realistic situation which would result in the given type of equation.	13-5
<b>E. <i>Analyze the effects of parameter changes on the graph of functions.</i></b>	
1. Predict the effects of changes in slope and y-intercept on the graph of a linear function.	See Glencoe's <i>Algebra 1 Integration • Applications • Connections Lesson Planning Guide</i>
2. Predict the effect on a graph which results from adding, subtracting, multiplying, or dividing various parts of an equation by a constant.	See Glencoe's <i>Algebra 1 Integration • Applications • Connections Lesson Planning Guide</i>
<b>F. <i>Explore and represent everyday situations using the sine and cosine functions.</i></b>	
1. Illustrate examples which approximate sine and cosine functions (voice patterns, radio frequency, etc.).	See Glencoe's <i>Advanced Mathematical Concepts Lesson Planning Guide</i> .

STANDARDS	LESSON REFERENCES
<b>CONTENT STANDARD 13: FUNCTIONS AND ALGEBRA CONCEPTS STUDENTS WILL UNDERSTAND AND APPLY ALGEBRAIC CONCEPTS</b>	
<b>A. Represent situations that involve variable quantities with expressions, equations, inequalities, and matrices.</b>	
1. Given a realistic problem, translate the problem into an expression, equation, inequality, or matrix as a first step to working toward a solution.	13-1, 13-2, 13-3, 13-5, 13-7
<b>B. Use tables and graphs as tools to interpret expressions, equations, and inequalities.</b>	
1. Given an expression, equation, or inequality, represent it in tabular or graphical form as a further step toward clarity and analysis.	13-5
<b>C. Operate on expressions and matrices and solve equations and inequalities.</b>	
1. Use appropriate steps to simplify expressions and matrices, in order to solve equalities and inequalities.	1-8, 1-9, 4-8, 12-3, 12-5
2. Solve quadratic equations using algebraic and graphing methods.	See Glencoe's <i>Algebra 1 Integration • Applications • Connections Lesson Planning Guide</i>
<b>D. Identify the implications and usefulness of mathematical abstractions and symbolism.</b>	
1. After solving the equation or inequality, use this information to make generalizations and/or explain what the results mean in the real-life problem or situation.	1-8, 1-9, 13-1, 13-2, 13-3, 13-7
2. Understand that putting problems into algebraic expressions in order to use learned steps toward solutions results in a more efficient way of solving problems than trial and error.	1-8, 1-9, 13-1, 13-2, 13-3, 13-7
<b>E. Use matrices to solve linear systems.</b>	
1. Verify solution of a matrix with a graphical solution.	1-8
2. Use Cramer's rule (with the aid of technology) to solve linear equations with matrices.	See Glencoe's <i>Advanced Mathematical Concepts Lesson Planning Guide</i> .
<b>F. Apply trigonometry to problem situations involving triangles.</b>	
1. Apply sine, cosine, or tangent to right triangles to find the measure of unknown sides or angles.	See Glencoe's <i>Algebra 1 Integration • Applications • Connections Lesson Planning Guide</i>
2. Translate realistic problems to right triangles in order to solve problems (e.g., height of a flagpole, distance of a ship, etc.).	9-6

STANDARDS	LESSON REFERENCES
<b>G. Determine the maximum and minimum points of a graph and interpret the results in problem situations.</b>	
1. Given the equation of parabola, find the maximum or minimum point.	See Glencoe's <i>Algebra 1 Integration • Applications • Connections Lesson Planning Guide</i>
2. Given the equation of a graph, find maximums and minimums and apply their meaning to realistic problems (e.g., height of a rocket).	11-9
<b>H. Describe limiting processes by examining infinite sequences, series, and areas under curves.</b>	
1. Use manipulatives to investigate limiting processes (e.g, constantly decrease the height of a cylinder and determine the effect on volume, etc.).	8-5, 8-8, 8-9, 8-10, 8-11, 8-12, 8-13
2. Estimate the limit (if any) of an infinite sequence.	2-6, 3-9
3. Find the sum of a geometric series.	See Glencoe's <i>Advanced Mathematical Concepts Lesson Planning Guide</i> .
4. Estimate (by counting smaller and smaller squares or trapezoids) areas under a curve and predict actual area under the curve.	See Glencoe's <i>Advanced Mathematical Concepts Lesson Planning Guide</i> .
<b>I. Evaluate the logic of algebraic procedures.</b>	
1. Explore algebraic relationships using technology.	13-1
2. Give a logical sequence of steps to lead to the solution of a more complicated algebraic problem.	13-1, 13-2, 13-3, 13-7