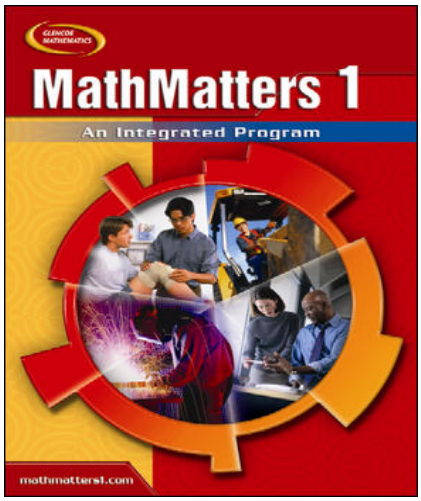
Glencoe

Content Expectations
Mathematics
High School



MathMatters 1

An Integrated Program

STANDARDS	PAGE REFERENCES

STRAND 1: QUANTITATIVE LITERACY AND LOGIC

"In an increasingly complex world, adults are challenged to apply sophisticated quantitative knowledge and reasoning in their professional and personal lives. The technological demands of the workplace, the abundance of data in the political and public policy context, and the array of information involved in making personal and family decisions of all types necessitate an unprecedented facility not only with fundamental mathematical, statistical, and computing ideas and processes, but with higher-order abilities to apply and integrate those ideas and processes in a range of areas." [1]

The Michigan Grade Level Content Expectations in Mathematics for grades K-8 prescribe a thorough treatment of number, including strong emphasis on computational fluency and understanding of number concepts, to be completed largely by the sixth grade. The expectations in this Quantitative Literacy and Logic strand provide a definition of secondary school quantitative literacy for all students and emphasize the importance of logic as part of mathematics and in everyday life. They assume fluency (that is, efficiency and accuracy) in calculation with the basic number operations involving rational numbers in all forms (including percentages and decimals), without calculators.

Mathematical reasoning and logic are at the heart of the study of mathematics. As students progress through elementary and middle school, they increasingly are asked to explain and justify the thinking underlying their work. In high school, students peel away the contexts and study the language and thought patterns of formal mathematical reasoning. By learning logic and by constructing arguments and proofs, students will strengthen not only their knowledge and facility with mathematics, but also their ways of thinking in other areas of study and in their daily lives.

Connections and applications of number ideas and logic to other areas of mathematics, such as algebra, geometry, and statistics, are emphasized in this strand. Number representations and properties extend from the rational numbers into the real and complex numbers, as well as to other systems that students will encounter both in the workplace and in more advanced mathematics. The expectations for calculation, algorithms and estimation reflect important uses of number in a range of real-life situations. Ideas about measurement and precision tie closely to geometry.

Codes used for Annotated Teacher's Edition pages are the initial caps of headings on that page.

STANDARDS		PAGE REFERENCES
STANDARD L1: REASONING ABOUT NUMBERS, SYSTEMS, AND QUANTITATIVE SITUATIONS		
Based on their knowledge of the properties of arithmetic, students understand and reason about numbers, number systems, and the relationships between them. They represent quantitative relationships using mathematical symbols, and interpret relationships from those representations.		
L1.1 Number Systems and Number Sense		
L1.1.1	Know the different properties that hold in different number systems, and recognize that the applicable properties change in the transition from the positive integers, to all integers, to the rational numbers, and to the real numbers.	**Student Edition:** 104-105, 108-109, 114, 118-119 *Are You Ready?* 102-103 **Annotated Teacher's Edition:** CE 105, 109; DI 105, 118; EL 109; FG 123; LW 106; MC 113
L1.1.2	Explain why the multiplicative inverse of a number has the same sign as the number, while the additive inverse of a number has the opposite sign.	**Student Edition:** 212, 214 #10, 218, 220 #15, 221 #52 **Annotated Teacher's Edition:** DI 212, 218; I 222
L1.1.3	Explain how the properties of associativity, commutativity, and distributivity, as well as identity and inverse elements, are used in arithmetic and algebraic calculations.	**Student Edition:** 119, 120 #5-#10, #22-#36 *Are You Ready?* 206 *Review and Practice Your Skills* 123 #38-#46, 124 #82-#87, 141 #84-#86 **Annotated Teacher's Edition:** EL 119; FG 123
L1.1.4	Describe the reasons for the different effects of multiplication by, or exponentiation of, a positive number by a number less than 0, a number between 0 and 1, and a number greater than 1.	**Student Edition:** 132, 135 #63-#64 *Are You Ready?* 102, 206 **Annotated Teacher's Edition:** AA 115; CE 103 #1, EL 112; LW 220
L1.1.5	Justify numerical relationships (e.g., show that the sum of even integers is even; that every integer can be written as $3m+k$, where k is 0, 1, or 2, and m is an integer; or that the sum of the first n positive integers is $n(n+1)/2$).	**Student Edition:** 108-109, 136 **Annotated Teacher's Edition:** DI 136; EL 109; I 124, 136; LW 110
L1.1.6	Explain the importance of the irrational numbers $\sqrt{2}$ and $\sqrt{3}$ in basic right triangle trigonometry; the importance of π because of its role in circle relationships; and the role of e in applications such as continuously compounded interest.	**Student Edition:** 80, 118, 121 #52 **Annotated Teacher's Edition:** EL 80; LW 82, 144 #4; PE 121

STANDARDS		PAGE REFERENCES
L1.2 Representations and Relationships		
L1.2.1	Use mathematical symbols (e.g., interval notation, set notation, summation notation) to represent quantitative relationships and situations.	**Student Edition:** 118 *Are You Ready?* 476 **Annotated Teacher's Edition:** CE 477; LW 494; TT 476
L1.2.2	Interpret representations that reflect absolute value relationships (e.g. $\| x - a \| \leq b$, *or* $a \pm b$) in such contexts as error tolerance.	**Student Edition:** 105, 106 #5-#8 *Check Understanding* 105 **Annotated Teacher's Edition:** TT 106
L1.2.3	Use vectors to represent quantities that have magnitude and direction; interpret direction and magnitude of a vector numerically, and calculate the sum and difference of two vectors.	This standard can be found in Glencoe's *Geometry* © 2008 on the following pages: **Student Edition:** 534-541
L1.2.4	Organize and summarize a data set in a table, plot, chart, or spreadsheet; find patterns in a display of data; understand and critique data displays in the media.	**Student Edition:** 6-9, 10-13, 16-19, 20-21, 24-27, 28-31, 34-37, 38-41 *MathWorks* 15 **Annotated Teacher's Edition:** CE 7, 11, 21, 25, 33; EL 24
L1.3 Counting and Probabilistic Reasoning		
L1.3.1	Describe, explain, and apply various counting techniques (e.g., finding the number of different 4-letter passwords; permutations; and combinations); relate combinations to Pascal's triangle; know when to use each technique.	**Student Edition:** 446-449, 450-453 *Review and Practice Your Skills* 454 **Annotated Teacher's Edition:** CE 447, 451, 457 #2; DI 450; LW 452; TT 446, 451, 452
L1.3.2	Define and interpret commonly used expressions of probability (e.g., chances of an event, likelihood, odds).	**Student Edition:** 436 **Annotated Teacher's Edition:** FG 436; LW 438
L1.3.3	Recognize and explain common probability misconceptions such as "hot streaks" and "being due."	Misconceptions can be discussed with the following examples. **Student Edition:** 464-467 **Annotated Teacher's Edition:** I 436, 464; LW 466

STANDARDS		PAGE REFERENCES
STANDARD L2: CALCULATION, ALGORITHMS, AND ESTIMATION		
Students calculate fluently, estimate proficiently, and describe and use algorithms in appropriate situations (e.g., approximating solutions to equations.) They understand the basic ideas of iteration and algorithms.		
L2.1 Calculation Using Real and Complex Numbers		
L2.1.1	Explain the meaning and uses of weighted averages (e.g., GNP, consumer price index, grade point average).	**Student Edition:** 264-267, 270-273, 274-277 **Annotated Teacher's Edition:** AA 266; LW 272; TT 264, 270, 273
L2.1.2	Calculate fluently with numerical expressions involving exponents; use the rules of exponents; evaluate numerical expressions involving rational and negative exponents; transition easily between roots and exponents.	**Student Edition:** 116 #21, #24-#26, #33, #37-#39, #41, 117 #58-#59, 132, 136-139, 404-405, 419 *Are You Ready?* 393 **Annotated Teacher's Edition:** AA 115; CE 393; EL 407, 420; LW 116 #2, #4
L2.1.3	Explain the exponential relationship between a number and its base 10 logarithm, and use it to relate rules of logarithms to those of exponents in expressions involving numbers.	**Student Edition:** 132-135, 136-139 **Annotated Teacher's Edition:** DI 136; I 132, 136; LW 134
L2.1.4	Know that the complex number i is one of two solutions to $x^2 = -1$.	This standard can be found in Glencoe's *Algebra 2* © 2008 on the following pages: **Student Edition:** 259-266
L2.1.5	Add, subtract, and multiply complex numbers; use conjugates to simplify quotients of complex numbers.	The following examples build skills of using the commutative, associative, and distributive properties that are important for understanding operations on complex numbers. **Student Edition:** 119, 120 #22-#36 *Are You Ready?* 206 *Review and Practice Your Skills* 122 #38-#46 **Annotated Teacher's Edition:** CE 119 #2; EL 119
L2.1.6	Recognize when exact answers aren't always possible or practical; use appropriate algorithms to approximate solutions to equations (e.g., to approximate square roots).	**Student Edition:** 143, 145 #50-#61, #63, 436 **Annotated Teacher's Edition:** CE 143; FG 436, 440; TT 142

STANDARDS		PAGE REFERENCES
	L2.2 Sequences and Iteration	
L2.2.1	Find the *n*th term in arithmetic, geometric, or other simple sequences.	**Student Edition:** 124-127, 128-129 *Review and Practice Your Skills* 130 **Annotated Teacher's Edition:** CE 125; LW 126; PE 126
L2.2.2	Compute sums of finite arithmetic and geometric sequences.	**Student Edition:** *Review and Practice Your Skills* 130 #43 **Annotated Teacher's Edition:** EL 129
L2.2.3	Use iterative processes in such examples as computing compound interest or applying approximation procedures.	**Student Edition:** 280-283 **Annotated Teacher's Edition:** CE 281; EL 282, 283; LW 282
	STANDARD L3: MEASUREMENT AND PRECISION	
	Students apply measurement units and calculations, and understand the concept of error.	
	L3.1 Measurement Units, Calculations, and Scales	
L3.1.1	Convert units of measurement within and between systems; explain how arithmetic operations on measurements affect units, and carry units through calculations correctly.	**Student Edition:** 56-59, 62-65 *Are You Ready?* 50 *MathWorks* 79 *Review and Practice Your Skills* 60 (Lesson 2-2) **Annotated Teacher's Edition:** CE 57, 63, 67; DA 49; DI 58; EL 57, 63, 83; TT 52
L3.1.2	Describe and interpret logarithmic relationships in such contexts as the Richter scale, the pH scale, or decibel measurements (e.g., explain why a small change in the scale can represent a large change in intensity); solve applied problems.	This standard can be found in Glencoe's *MathMatters 3: An Integrated Program* © 2006 on the following pages: **Student Edition:** 600-603, 606 #41-#52, 607 #27-#28, 609 #22

STANDARDS		PAGE REFERENCES
	L3.2 Understanding Error	
L3.2.1	Determine what degree of accuracy is reasonable for measurements in a given situation; express accuracy through use of significant digits, error tolerance, or percent of error; describe how errors in measurements are magnified by computation; recognize accumulated error in applied situations.	**Student Edition:** 52-55, 90 #1-#4, 91 Example 3, 93 #30-#33 *MathWorks* 61 *Review and Practice Your Skills* 60 (Lesson 2-1) **Annotated Teacher's Edition:** CE 53, 91 #3; EL 91; LW 54
L3.2.2	Describe and explain round-off error, rounding, and truncating.	**Student Edition:** 13 #52-#55, 80-81 *Are You Ready?* 4 *Estimation Tip* 261 **Annotated Teacher's Edition:** CE 81; LW 82
L3.2.3	Know the meaning of and interpret statistical significance, margin of error, and confidence level.	Statistical significance, margin of error, and confidence level, though not specifically mentioned in the text, can be discussed with the following examples. **Student Edition:** 52-55, 80-81, 91 #1-#4, 93 #30-#33 **Annotated Teacher's Edition:** CE 53
	STANDARD L4: MATHEMATICAL REASONING, LOGIC, AND PROOF	
	Students understand mathematical reasoning as being grounded in logic and proof and can distinguish mathematical arguments from other types of arguments. They can interpret arguments made about quantitative situations in the popular media. Students know the language and laws of logic and can apply them in both mathematical and everyday settings. They write proofs using direct and indirect methods and use counterexamples appropriately to show that statements are false.	
	L4.1 Mathematical Reasoning	
L4.1.1	Distinguish between inductive and deductive reasoning, identifying and providing examples of each.	**Student Edition:** 482-485, 488-491 **Annotated Teacher's Edition:** CE 482, 489; EL 484; LW 484
L4.1.2	Differentiate between statistical arguments (statements verified empirically using examples or data) and logical arguments based on the rules of logic.	**Student Edition:** 482-485, 488-491, 498-501 **Annotated Teacher's Edition:** CE 499; LW 499

STANDARDS		PAGE REFERENCES
L4.1.3	Define and explain the roles of axioms (postulates), definitions, theorems, counterexamples, and proofs in the logical structure of mathematics; identify and give examples of each.	**Student Edition:** 483, 484 #5, 489 Example 2, 490 #10-#11, 491 #27 **Annotated Teacher's Edition:** CE 483 #2; EL 484
	L4.2 Language and Laws of Logic	
L4.2.1	Know and use the terms of basic logic (e.g., proposition, negation, truth and falsity, implication, if and only if, contrapositive, and converse).	**Student Edition:** 482, 488, 498, 501 #19 *MathWorks* 487 **Annotated Teacher's Edition:** EL 489, 491
L4.2.2	Use the connectives "NOT," "AND," "OR," and "IF…,THEN," in mathematical and everyday settings. Know the truth table of each connective and how to logically negate statements involving these connectives.	**Student Edition:** 488-491 *Assessment* 513 #4-#8 **Annotated Teacher's Edition:** CE 489; EL 489, 491; LW 490; TT 488, 489
L4.2.3	Use the quantifiers "THERE EXISTS" and "ALL" in mathematical and everyday settings and know how to logically negate statements involving them.	While these quantifiers are not specifically used in this text, they could be used with the following examples. **Student Edition:** 492-495, 498-501
L4.2.4	Write the converse, inverse, and contrapositive of an "If…, then…" statement; use the fact, in mathematical and everyday settings, that the contrapositive is logically equivalent to the original while the inverse and converse are not.	This standard can be found in Glencoe's *MathMatters 2: An Integrated Program* © 2006 on the following pages: **Student Edition:** 530-531, 532-535, 536-537, 542-545, 546-547, 552-554, 555, 624-625 This standard also can be found in Glencoe's *MathMatters 3: An Integrated Program* © 2006 on the following pages: **Student Edition:** 124-127, 132 #1-#8, 134-137, 142 #32, 143 #15, 144 #7, 145 #20
	L4.3 Proof	
L4.3.1	Know the basic structure for the proof of an "If…, then…" statement (assuming the hypothesis and ending with the conclusion) and know that proving the contrapositive is equivalent.	**Student Edition:** 488-489, 490 #15-#20 *Assessment* 513 #4-#8 **Annotated Teacher's Edition:** EL 491; TT 488

STANDARDS		PAGE REFERENCES
L4.3.2	Construct proofs by contradiction; use counterexamples, when appropriate, to disprove a statement.	**Student Edition:** 483, 484 #5, 489 Example 2, 490 #10-#11, 491 #27 **Annotated Teacher's Edition:** CE 483 #2; EL 484
L4.3.3	Explain the difference between a necessary and a sufficient condition within the statement of a theorem; determine the correct conclusions based on interpreting a theorem in which necessary or sufficient conditions in the theorem or hypothesis are satisfied.	**Student Edition:** 488-491, 498-501, 502-503 **Annotated Teacher's Edition:** 5MW 492; AA 501; CE 503; EL 489

STRAND 2: ALGEBRA AND FUNCTIONS

In the middle grades, students see the progressive generalization of arithmetic to algebra. They learn symbolic manipulation skills and use them to solve equations. They study simple forms of elementary polynomial functions such as linear, quadratic, and power functions as represented by tables, graphs, symbols, and verbal descriptions.

In high school, students continue to develop their "symbol sense" by examining expressions, equations, and functions, and applying algebraic properties to solve equations. They construct a conceptual framework for analyzing any function and, using this framework, they revisit the functions they have studied before in greater depth. By the end of high school, their catalog of functions will encompass linear, quadratic, polynomial, rational, power, exponential, logarithmic, and trigonometric functions. They will be able to reason about functions and their properties and solve multi-step problems that involve both functions and equation-solving. Students will use deductive reasoning to justify algebraic processes as they solve equations and inequalities, as well as when transforming expressions.

This rich learning experience in Algebra will provide opportunities for students to understand both its structure and its applicability to solving real-world problems. Students will view algebra as a tool for analyzing and describing mathematical relationships, and for modeling problems that come from the workplace, the sciences, technology, engineering, and mathematics.

STANDARDS		PAGE REFERENCES
STANDARD A1: EXPRESSIONS, EQUATIONS, AND INEQUALITIES		
Students recognize, construct, interpret, and evaluate expressions. They fluently transform symbolic expressions into equivalent forms. They determine appropriate techniques for solving each type of equation, inequality, or system of equations, apply the techniques correctly to solve, justify the steps in the solutions, and draw conclusions from the solutions. They know and apply common formulas.		
A1.1 Construction, Interpretation, and Manipulation of Expressions (linear, quadratic, polynomial, rational, power, exponential, logarithmic, and trigonometric)		
A1.1.1	Give a verbal description of an expression that is presented in symbolic form, write an algebraic expression from a verbal description, and evaluate expressions given values of the variables.	**Student Edition:** 108 #1-#3, 111 #51-#54, 125 Example 3, #1-#11, 126-127 *Are You Ready?* 135 #17-#28 *Assessment* 149 #33-#37 *Review* 147 #38-#48 **Annotated Teacher's Edition:** CE 125
A1.1.2	Know the definitions and properties of exponents and roots, transition fluently between them, and apply them in algebraic expressions.	**Student Edition:** 132-135, 136-139, 142-145 *Review* 148 **Annotated Teacher's Edition:** CE 137, 143; EL 143; LW 138; TT 134, 142
A1.1.3	Factor algebraic expressions using, for example, greatest common factor, grouping, and the special product identities (e.g., differences of squares and cubes).	**Student Edition:** 414-417, 418-421 **Annotated Teacher's Edition:** AA 417; CE 415, 419; EL 420-421; LW 416; TT 414, 418, 419
A1.1.4	Add, subtract, multiply, and simplify polynomials and rational expressions (e.g., multiply $(x - 1)(1 - x^2 + 3)$; simplify $9x - x^3/x + 3$)	**Student Edition:** 395 Example 2, 396 #33-#44, 397 #54-#59, 389-401, 404-407, 408-411 *Are You Ready?* 392 **Annotated Teacher's Edition:** AA 405; CE 399, 405; DI 399; EL 401, 407; TT 400, 409
A1.1.5	Divide a polynomial by a monomial.	**Student Edition:** 418-421 *Assessment* 429 #15-#17, #28-#33 *Review and Practice Your Skills* 422 #28-#51 **Annotated Teacher's Edition:** CE 419; EL 420, 421; LW 420; TT 418, 419

STANDARDS		PAGE REFERENCES
A1.1.6	Transform exponential and logarithmic expressions into equivalent forms using the properties of exponents and logarithms including the inverse relationship between exponents and logarithms.	**Student Edition:** 132-135, 136-139 **Annotated Teacher's Edition:** CE 133, 137; EL 133, 137; LW 134, 138; TT 134
	A1.2 Solutions of Equations and Inequalities (linear, quadratic, polynomial, rational, power, exponential, logarithmic, and trigonometric)	
A1.2.1	Write equations and inequalities with one or two variables to represent mathematical or applied situations, and solve.	**Student Edition:** 211 #53, 215 #44-#46, #62, 219 Example 4, 221 #49-#50, 223 Example 4, 224 #38, 225 #45 **Annotated Teacher's Edition:** CE 213 #2-#3, 219 #4, 223 #3; EL 213
A1.2.2	Associate a given equation with a function whose zeros are the solutions of the equation.	**Student Edition:** 315 Example 3, 318-321 *Review and Practice Your Skills* 322 #28-#51 **Annotated Teacher's Edition:** CE 315 #3, 319; FG 315, 316; TT 319
A1.2.3	Solve (and justify steps in the solutions) linear and quadratic equations and inequalities, including systems of up to three linear equations with three unknowns; apply the quadratic formula appropriately.	**Student Edition:** 212-213, 223, 246-249 *Check Understanding* 229 **Annotated Teacher's Edition:** EL 213; TT 217, 224, 228, 229, 230, 247
A1.2.4	Solve absolute value equations and inequalities, (e.g. solve $\lvert x - 3 \rvert \leq 6$), and justify steps in the solution.	**Student Edition:** 105, 107 #54-#55, 246-249 *Assessment* 253 #28-#29 *Review* 252 Lesson 5-9 **Annotated Teacher's Edition:** CE 247; TT 247
A1.2.5	Solve polynomial equations and equations involving rational expressions (e.g. solve $-2x(x^2 + 4x+3) = 0$; solve $x - 1/_{x+6} = 3$), and justify steps in the solution.	**Student Edition:** 396 #47, 397 #50-#52, 398 #1-#4, 400 #42, 407 #52-#53, 409 Example 2, 410 #48, 417 #59 **Annotated Teacher's Edition:** AA 405; I 398; TT 400
A1.2.6	Solve power equations (e.g., $(x + 1)^3 = 8$) and equations including radical expressions (e.g., $\sqrt{3x - 7} = 7$), justify steps in the solution, and explain how extraneous solutions may arise.	**Student Edition:** 132-135, 136-139, 142-145 *Review* 148 **Annotated Teacher's Edition:** CE 137, 143; EL 143; LW 138; TT 134, 142

STANDARDS	PAGE REFERENCES
A1.2.7 Solve exponential and logarithmic equations (e.g., $3(2^x) = 24$), $2\ ln(x + 1) = 4$), and justify steps in the solution.	**Student Edition:** 132-135, 136-139 **Annotated Teacher's Edition:** CE 133, 137; EL 133, 137; LW 134, 138; TT 134
A1.2.8 Solve an equation involving several variables (with numerical or letter coefficients) for a designated variable, and justify steps in the solution.	**Student Edition:** 318-321, 398 #1-#4, 409 Example 2, 410 #48, 417 #58-#59 *MathWorks* 333 **Annotated Teacher's Edition:** CE 319; I 318; LW 320
A1.2.9 Know common formulas (e.g., slope, distance between two points, quadratic formula, compound interest, distance = velocity • time), and apply appropriately in contextual situations.	**Student Edition:** 232-235, 270, 280, 290 *Review and Practice Your Skills* 236 #31-#51 **Annotated Teacher's Edition:** CE 233; LW 234, 282; TT 232
A1.2.10 Use special values of the inverse trigonometric functions to solve trigonometric equations over specific intervals (e.g., $2sin\ x - I = 0$ for $0 \le x \le 2\pi$).	This standard can be found in Glencoe's *MathMatters 3: An Integrated Program* © 2006 on the following pages: **Student Edition:** 614-167, 618-621, 622 #14-#22, 633 #47, 637 #47, 639 #11
STANDARD A2: FUNCTIONS	
Students understand functions, their representations, and their attributes. They perform transformations, combine and compose functions, and find inverses. Students classify functions and know the characteristics of each family. They work with functions with real coefficients fluently.	
A2.1 Definitions, Representations, and Attributes of Functions	
A2.1.1 Recognize whether a relationship (given in contextual, symbolic, tabular, or graphical form) is a function; and identify its domain and range.	**Student Edition:** 314-317, 338-341 *Review* 343 Lesson 7-3 *Review and Practice Your Skills* 322 #1-#27 **Annotated Teacher's Edition:** AA 317; CE 315; FG 315, 316; I 314; LW 316; TT 314

STANDARDS		PAGE REFERENCES
A2.1.2	Read, interpret, and use function notation, and evaluate a function at a value in its domain.	**Student Edition:** 315-317 *Assessment* 345 #11 *Review and Practice Your Skills* 343 #23 **Annotated Teacher's Edition:** CE 315 #3-#4; FG 315, 316
A2.1.3	Represent functions in symbols, graphs, tables, diagrams, or words, and translate among representations.	**Student Edition:** 314-317, 338-341 *Review* 343 Lesson 7-3 *Review and Practice Your Skills* 322 #1-#27 **Annotated Teacher's Edition:** AA 317; CE 315; FG 315, 316; I 314; LW 316; TT 314
A2.1.4	Recognize that functions may be defined by different expressions over different intervals of their domains; such functions are piecewise-defined (e.g., absolute value and greatest integer functions).	**Student Edition:** 339 *Theme* 344 **Annotated Teacher's Edition:** EL 341
A2.1.5	Recognize that functions may be defined recursively, and compute values of and graph simple recursively defined functions (e.g., $f(0) = 5$, and $f(n) = f(n\text{-}1) + 2$).	**Student Edition:** 316 Example 4, #15, 317 #24-#27 **Annotated Teacher's Edition:** 5MW 314; FG 315
A2.1.6	Identify the zeros of a function and the intervals where the values of a function are positive or negative, and describe the behavior of a function, as x approaches postive or negative infinity, given the symbolic and graphical representations.	**Student Edition:** 315 Example 3, 318-321 *Review and Practice Your Skills* 322 #28-#51 **Annotated Teacher's Edition:** CE 315 #3, 319; FG 315, 316; TT 319
A2.1.7	Identify and interpret the key features of a function from its graph or its formula(e), (e.g. slope, intercept(s), asymptote(s), maximum and minimum value(s), symmetry, average rate of change over an interval, and periodicity).	**Student Edition:** 314-317, 318-319, 324-327, 338-341 *Review* 343 Lesson 7-3, Lesson 7-5 *Review and Practice Your Skills* 322 #1-#27 **Annotated Teacher's Edition:** CE 325; DI 324; TT 314

STANDARDS		PAGE REFERENCES
A2.2 Operations and Transformations		
A2.2.1	Combine functions by addition, subtraction, multiplication, and division.	A concept similar to combining functions is used in the following examples where polynomials are combined by using operations. **Student Edition:** 398-403, 404-407, 408-411, 418-421 *Review and Practice Your Skills* 402 #31-#52, 403 #71-#80, 422 #28-#51 **Annotated Teacher's Edition:** CE 399, 405, 419; DI 399; TT 412
A2.2.2	Apply given transformations (e.g., vertical or horizontal shifts, stretching or shrinking, or reflections about the *x*- and *y*-axes) to basic functions, and represent symbolically.	**Student Edition:** 370-373, 374-377, 380-383 **Annotated Teacher's Edition:** CE 371, 375, 381; LW 372; TT 381
A2.2.3	Recognize whether a function (given in tabular or graphical form) has an inverse and recognize simple inverse pairs (e.g., $f(x) = x^3$ and $g(x) = x^{1/3}$).	This standard can be found in Glencoe's *MathMatters 2: An Integrated Program* © 2006 on the following pages: **Annotated Teacher's Edition:** CE 269; ITL 504 This standard also can be found in Glencoe's *Algebra 2* © 2008 on the following pages: 391-396
A2.3 Families of Functions (linear, quadratic, polynomial, rational, power, exponential, logarithmic, and trigonometric)		
A2.3.1	Identify a function as a member of a family of functions based on its symbolic, or graphical representation; recognize that different families of functions have different asymptotic behavior at infinity, and describe these behaviors.	**Student Edition:** 320 **Annotated Teacher's Edition:** EL 341
A2.3.2	Describe the tabular pattern associated with functions having constant rate of change (linear); or variable rates of change.	**Student Edition:** 314 #2, 316 Example 4, 318 #1, Example 1, 319 Example 2, 320 Example 4, #10-#11, 338 #4 **Annotated Teacher's Edition:** 5MW 314; CE 319; FG 315

STANDARDS		PAGE REFERENCES
A2.3.3	Write the general symbolic forms that characterize each family of functions. (e.g., $f(x) = A_0a^x$; $f(x) = A\sin Bx$)	**Student Edition:** 315-317 *Assessment* 345 #11 *Review and Practice Your Skills* 343 #23 **Annotated Teacher's Edition:** CE 315 #3-#4; FG 315, 316
	A2.4 Lines and Linear Functions	
A2.4.1	Write the symbolic forms of linear functions (standard [i.e., $Ax + By = C$, where $B \neq 0$], point-slope, and slope-intercept) given appropriate information, and convert between forms.	**Student Edition:** 328-331 *MathWorks* 333 #5 *Review and Practice Your Skills* 332 #18-#33 **Annotated Teacher's Edition:** CE 329; EL 329; LW 330
A2.4.2	Graph lines (including those of the form $x = h$ and $y = k$) given appropriate information.	**Student Edition:** 139 #63, 318-321, 328-331 *Review* 343 #24 **Annotated Teacher's Edition:** AA 328; CE 319, 329; EL 329, 340; LW 320
A2.4.3	Relate the coefficients in a linear function to the slope and x- and y-intercepts of its graph.	**Student Edition:** 324-327, 328-331 *MathWorks* 333 *Review and Practice Your Skills* 332 **Annotated Teacher's Edition:** AA 325; CE 325, 329; EL 329
A2.4.4	Find an equation of the line parallel or perpendicular to given line, through a given point; understand and use the facts that non-vertical parallel lines have equal slopes, and that non-vertical perpendicular lines have slopes that multiply to give -1.	**Student Edition:** 331 #33-#38, 352-355 **Annotated Teacher's Edition:** CE 353; LW 354 #3; TT 352

STANDARDS		PAGE REFERENCES
A2.5 Exponential and Logarithmic Functions		
A2.5.1	Write the symbolic form and sketch the graph of an exponential function given appropriate information. (e.g., given an initial value of 4 and a rate of growth of 1.5, write $f(x) = 4\ (1.5)^x$).	Equations and expressions with exponents are listed below: **Student Edition:** 135 #65-#68, 136-139 *Review and Practice Your Skills* 140 Lesson 3-8, 141 #113-#140 **Annotated Teacher's Edition:** CE 137; EL 137; LW 138
A2.5.2	Interpret the symbolic forms and recognize the graphs of exponential and logarithmic functions (e.g., $f(x) = 10^x$, $f(x) = \log x$, $f(x) = e^x$, $f(x) = \ln x$); recognize the logarithmic function as the inverse of the exponential function.	Equations and expressions with exponents are listed below: **Student Edition:** 135 #65-#68, 136-139 *Review and Practice Your Skills* 140 Lesson 3-8, 141 #113-#140 **Annotated Teacher's Edition:** CE 137; EL 137; LW 138
A2.5.3	Apply properties of exponential and logarithmic functions (e.g., $a^{x+y} = a^x a^y$; $\log(ab) = \log a + \log b$).	**Student Edition:** 135 #65-#68, 136-139 *Are You Ready?* 393 *Review and Practice Your Skills* 140 Lesson 3-8, 141 #113-#140 **Annotated Teacher's Edition:** CE 137; EL 137; LW 138
A2.5.4	Understand and use the fact that the base of an exponential function determines whether the function increases or decreases and understand how the base affects the rate of growth or decay.	This standard can be found in Glencoe's *MathMatters 3: An Integrated Program* © 2006 on the following pages: **Student Edition:** 594-597, 598 #16-#28, 599 #57, 606 #37-#40, 607 #26
A2.5.5	Relate exponential and logarithmic functions to real phenomena, including half-life and doubling time.	**Student Edition:** 138 #13, #15, 139 #54

STANDARDS		PAGE REFERENCES
	A2.6 Quadratic Functions	
A2.6.1	Write the symbolic form and sketch the graph of a quadratic function given appropriate information (e.g., vertex, intercepts, etc.).	This text introduces quadratic graphs in the following examples. **Student Edition:** 338 Example 1c, 339 Example 2b, 340 #6, 341 #20-#24
A2.6.2	Identify the elements of a parabola (vertex, axis of symmetry, direction of opening) given its symbolic form or its graph, and relate these elements to the coefficient(s) of the symbolic form of the function.	**Student Edition:** 338 Example 1c, 339 Example 2b, 340 #6, 341 #20-#24
A2.6.3	Convert quadratic functions from standard to vertex form by completing the square.	Completing the square can be found in Glencoe's *MathMatters 3: An Integrated Program* © 2006 on the following pages: **Student Edition:** 538 #17-#28, 539 #39-#47, 553 #20-#22
A2.6.4	Relate the number of real solutions of a quadratic equation to the graph of the associated quadratic function.	**Student Edition:** 338 Example 1c, 339 Example 2b, 340 #6, 341 #20-#24
A2.6.5	Express quadratic functions in vertex form to identify their maxima or minima, and in factored form to identify their zeros.	This standard can be found in Glencoe's *MathMatters 3: An Integrated Program* © 2006 on the following pages: **Student Edition:** 522 #10-#13, 523 #19-#20, 525 ex 1, 526 ex 3, 527 #15-#17, 528 #27-#29, 529 #36-#38, 539 #33-#38, 542 ex 3, 549 #37, 552 #14-#16
	A2.7 Power Functions (including roots, cubics, quartics, etc.)	
A2.7.1	Write the symbolic form and sketch the graph of power functions.	**Annotated Teacher's Edition:** CE 339 #1d This standard also can be found in Glencoe's *Algebra 2* © 2008 on the following pages: **Student Edition:** 331-338, 339-345, 346-347

STANDARDS		PAGE REFERENCES
A2.7.2	Express direct and inverse relationships as functions (e.g., $y = kx^n$ and $y = kx^{-n}$, $n > 0$) and recognize their characteristics (e.g., in $y = x^3$, note that doubling x results in multiplying y by a factor of 8).	This standard can be found in Glencoe's *MathMatters 2: An Integrated Program* © 2006 on the following pages: **Student Edition:** 276-279, 280, 282-285, 288, 289, 606 This standard also can be found in Glencoe's *MathMatters 3: An Integrated Program* © 2006 on the following pages: **Student Edition:** 580-583, 584-587, 588 #1-#24, 589 #31-#34, 589 #31-#34, 599 #45-#50, 605 #27-#33
A2.7.3	Analyze the graphs of power functions, noting reflectional or rotational symmetry.	Reflectional and rotational symmetry are introduced in the following examples. **Student Edition:** 374-377, 380-383 *Review* 386 **Annotated Teacher's Edition:** AA 374; CE 375, 381; TT 380
	A2.8 Polynomial Functions	
A2.8.1	Write the symbolic form and sketch the graph of simple polynomial functions.	Polynomial functions are not covered in this text. However, polynomial equations are covered and listed in the following examples. **Student Edition:** 396 #14, #46-#47, 397 #48-#49, 401 #52-#53, 404 #1-#4, 407 #57-#60, 411 #56
A2.8.2	Understand the effects of degree, leading coefficient, and number of real zeros on the graphs of polynomial functions of degree greater than 2.	While graphs of polynomial functions are not covered in this text, the degree, leading coefficient, and numbers of real zeros in polynomial equations are covered in the following examples. **Student Edition:** 394, 396 #9 **Annotated Teacher's Edition:** EL 396; LW 396, 410; TT 394
A2.8.3	Determine the maximum possible number of zeros of a polynomial function, and understand the relationship between the x-intercepts of the graph and the factored form of the function.	**Student Edition:** 407 #57-#60 **Annotated Teacher's Edition:** TT 394

STANDARDS	PAGE REFERENCES
A2.9 Rational Functions	
A2.9.1 Write the symbolic form and sketch the graph of simple rational functions.	**Student Edition:** 315, 316 Example 4, #10, 319 Example 2, 320 #11, #13-#24, 321 #39, 331 #32-#34 *Review* 343 #24 **Annotated Teacher's Edition:** CE 315 #3, 318 #2-#3; FG 315
A2.9.2 Analyze graphs of simple rational functions (e.g., $f(x) = 2x + 1 / x - 1$; $g(x) = x / x^2 - 4$) and understand the relationship between the zeros of the numerator and denominator and the function's intercepts, asymptotes, and domain.	**Student Edition:** 314, 318-321, 340 Example 3 **Annotated Teacher's Edition:** EL 340; I 318; TT 319
A2.10 Trigonometric Functions	
A2.10.1 Use the unit circle to define sine and cosine; approximate values of sine and cosine (e.g., *sin 3*, or *cos 0.5*); use sine and cosine to define the remaining trigonometric functions; explain why the trigonometric functions are periodic.	This standard can be found in Glencoe's *MathMatters 2: An Integrated Program* © 2006 on the following pages: **Student Edition:** 489-491, 492, 511, 621 This standard also can be found in Glencoe's *MathMatters 3: An Integrated Program* © 2006 on the following pages: **Student Edition:** 614-617, 622 #1-#13, 623 #23-#30, 633 #41-#46, 636 #11-#17, 639 #1-#6, 640 #8, 641 #22
A2.10.2 Use the relationship between degree and radian measures to solve problems.	Radian measures are not covered in this text. Degrees are covered in the following example. **Student Edition:** 157 Also see Glencoe's *Algebra 2* © 2008 pages 768-774.
A2.10.3 Use the unit circle to determine the exact values of sine and cosine, for integer multiples of $\pi/6$ and $\pi/4$.	This standard can be found in Glencoe's *Algebra 2* © 2008 on the following pages: **Student Edition:** 769, 799-805
A2.10.4 Graph the sine and cosine functions; analyze graphs by noting domain, range, period, amplitude, and location of maxima and minima.	This standard can be found in Glencoe's *MathMatters 3: An Integrated Program* © 2006 on the following pages: **Student Edition:** 624-627, 628-631, 632 #22-#40, 638 #30-#33, 639 #18-#20

STANDARDS		PAGE REFERENCES
A2.10.5	Graph transformations of basic trigonometric functions (involving changes in period, amplitude, and midline) and understand the relationship between constants in the formula and the transformed graph.	This standard can be found in Glencoe's *MathMatters 3: An Integrated Program* © 2006 on the following pages: **Student Edition:** 628-631, 632 #22-#40, 638 #30-#33, 639 #18-#20, 641 #23-#24
	STANDARD A3: MATHEMATICAL MODELING	
	Students construct or select a function to model a real-world situation in order to solve applied problems. They draw on their knowledge of families of functions to do so.	
	A3.1 Models of Real-world Situations Using Families of Functions. *Example: An initial population of 300 people grows at 2% per year. What will the population be in 10 years?*	
A3.1.1	Identify the family of function best suited for modeling a given real-world situation (e.g., quadratic functions for motion of an object under the force of gravity; exponential functions for compound interest; trigonometric functions for periodic phenomena. In the example above, recognize that the appropriate general function is exponential ($P = P_0a^t$)	**Student Edition:** 316 #11, 321 #31, 330 #77-#11, 331 #26-#30 *Assessment* 345 #25 *MathWorks* 333 #5 *Review* 343 #26
A3.1.2	Adapt the general symbolic form of a function to one that fits the specifications of a given situation by using the information to replace arbitrary constants with numbers. *In the example above, substitute the given values $P_0 = 300$ and $a = 1.02$ to obtain $P = 300(1.02)^t$.*	**Student Edition:** 316 #11, 321 #32, #36, #41-#43, 330 #10-#11, 331 #29-#30 *MathWorks* 333 #6 *Review* 343 #28 **Annotated Teacher's Edition:** TT 319
A3.1.3	Using the adapted general symbolic form, draw reasonable conclusions about the situation being modeled. *In the example above, the exact solution is 365.698, but for this problem an appropriate approximation is 365.*	**Student Edition:** 321 #42 *Assessment* 345 #24-#26 **Annotated Teacher's Edition:** EL 326

STANDARDS		PAGE REFERENCES
STRAND 3: GEOMETRY AND TRIGONOMETRY		
In Grades K–5, students study figures such as triangles, rectangles, circles, rectangular solids, cylinders, and spheres. They examine similarities and differences between geometric shapes. They learn to quantify geometric figures by measuring and calculating lengths, angles, areas and volumes. In Grades 6-8, students broaden their understanding of area and volume and develop the basic concepts of congruence, similarity, symmetry and the Pythagorean Theorem. They apply these ideas to solve geometric problems, including ones related to the real world. In Grades 9–12, students see geometry developed as a coherent, structured subject. They use the geometric skills and ideas introduced earlier, such as congruence and similarity, to solve a wide variety of problems. There is an emphasis on the importance of clear language (e.g. for postulates, definitions and theorems) and on learning to construct geometric proofs. In this process, students build geometric intuition and facility at deductive reasoning. They use elements of logic and reasoning as described in the Quantitative Literacy and Logic strand, including both direct and indirect proof presented in narrative form. They begin to use new techniques, including transformations and trigonometry. They apply these ideas to solve complex problems about two- and three-dimensional figures, again including ones related to the real world. Their spatial visualization skills will be developed through the study of the relationships between two- and three-dimensional shapes.		
STANDARD G1: FIGURES AND THEIR PROPERTIES		
Students represent basic geometric figures, polygons, and conic sections and apply their definitions and properties in solving problems and justifying arguments, including constructions and representations in the coordinate plane. Students represent three-dimensional figures, understand the concepts of volume and surface area, and use them to solve problems. They know and apply properties of common three-dimensional figures.		
G1.1 Lines and Angles; Basic Euclidean and Coordinate Geometry		
G1.1.1	Solve multi-step problems and construct proofs involving vertical angles, linear pairs of angles supplementary angles, complementary angles, and right angles.	**Student Edition:** 215 #44, 352-355 *Are You Ready?* 155 *Review* 384 Lesson 8-1 **Annotated Teacher's Edition:** CE 155 Angles, 353 #1; DI 353; LW 354; TT 352
G1.1.2	Solve multi-step problems and construct proofs involving corresponding angles, alternate interior angles, alternate exterior angles, and same-side (consecutive) interior angles.	**Student Edition:** 353 *Review* 384 Lesson 8-1 **Annotated Teacher's Edition:** CE 353 #2; DI 354; TT 360

STANDARDS		PAGE REFERENCES
G1.1.3	Perform and justify constructions, including midpoint of a line segment and bisector of an angle, using straightedge and compass.	**Student Edition:** 356-359 *MathWorks* 361 #4 *Review and Practice Your Skills* 360 Lesson 8-2 **Annotated Teacher's Edition:** CE 357, 360 Lesson 8-2; DI 356; EL 357; I 356; LW 358
G1.1.4	Given a line and a point, construct a line through the point that is parallel to the original line using straightedge and compass; given a line and a point, construct a line through the point that is perpendicular to the original line; justify the steps of the constructions.	**Student Edition:** 356-359 *Review and Practice Your Skills* 360 #27-#28, 361 #41-#42 **Annotated Teacher's Edition:** CE 357 #3
G1.1.5	Given a line segment in terms of its endpoints in the coordinate plane, determine its length and midpoint.	**Student Edition:** 156, 356-359 **Annotated Teacher's Edition:** DI 356; LW 358
G1.1.6	Recognize Euclidean Geometry as an axiom system; know the key axioms and understand the meaning of and distinguish between undefined terms (e.g., point, line, plane), axioms, definitions, and theorems.	**Student Edition:** 156-159 *Review and Practice Your Skills* 164 Lesson 4-1 **Annotated Teacher's Edition:** CE 164 Lesson 4-1; DI 156; EL 157; LW 158
	G1.2 Triangles and Their Properties	
G1.2.1	Prove that the angle sum of a triangle is 180° and that an exterior angle of a triangle is the sum of the two remote interior angles.	**Student Edition:** 364 *Think Back* 161
G1.2.2	Construct and justify arguments and solve multi-step problems involving angle measure, side length, perimeter, and area of all types of triangles.	**Student Edition:** 67, 68 #13, #16, #24, 324 #10 *Are You Ready?* 155 #12 *Think Back* 184 **Annotated Teacher's Edition:** AA 67; CE 67 #3; DI 68; EL 160; LW 68 #2
G1.2.3	Know a proof of the Pythagorean Theorem and use the Pythagorean Theorem and its converse to solve multi-step problems.	**Student Edition:** 334-337 *Are You Ready?* 305 *Ready* 344 Lesson 7-7 **Annotated Teacher's Edition:** CE 305 #9, 335; EL 334, 335; LW 336

STANDARDS		PAGE REFERENCES
G1.2.4	Prove and use the relationships among the side lengths and the angles of 30º- 60º- 90º triangles and 45º- 45º- 90º triangles.	**Student Edition:** 161 Example 2, 163 #35 **Annotated Teacher's Edition:** CE 161 #2a
G1.2.5	Solve multi-step problems and construct proofs about the properties of medians, altitudes, and perpendicular bisectors to the sides of a triangle, and the angle bisectors of a triangle; using a straightedge and compass, construct these lines.	**Student Edition:** 356-369 *Review* 385 Lesson 8-2 *Review and Practice Your Skills* 361 #38-#42 **Annotated Teacher's Edition:** CE 357; DI 356; EL 357
	G1.3 Triangles and Trigonometry	
G1.3.1	Define the sine, cosine, and tangent of acute angles in a right triangle as ratios of sides; solve problems about angles, side lengths, or areas using trigonometric ratios in right triangles.	This standard can be found in Glencoe's *MathMatters 2: An Integrated Program* © 2006 on the following pages: **Student Edition:** 488-491, 492-493, 494-497, 498-501, 502-503, 511-512, 513, 545, 621-622 *MathWorks* 503 This standard can be found in Glencoe's *MathMatters 3: An Integrated Program* © 2006 on the following pages: **Student Edition:** 614-617, 622 #1-#13, 623 #23-#30, 633 #41-#46, 636 #11-#17, 639 #1-#6, 640 #8, 641 #22
G1.3.2	Know and use the Law of Sines and the Law of Cosines and use them to solve problems; find the area of a triangle with sides a and b and included angle θ using the formula Area = (1/2) a b sin θ.	This standard can be found in Glencoe's *Algebra 2* © 2008 on the following pages: **Student Edition:** 785-792 and 793-798
G1.3.3	Determine the exact values of sine, cosine, and tangent for 0°, 30°, 45°, 60°, and their integer multiples, and apply in various contexts.	This standard can be found in Glencoe's *MathMatters 2: An Integrated Program* © 2006 on the following pages: **Student Edition:** 507 #27-#28, #29-#31 This standard can be found in Glencoe's *MathMatters 3: An Integrated Program* © 2006 on the following pages: **Student Edition:** 614-617, 622 #1-#13, 623 #23-#30, 633 #41-#46, 636 #11-#17, 639 #1-#6, 640 #8, 641 #22

STANDARDS		PAGE REFERENCES
	G1.4 Quadrilaterals and Their Properties	
G1.4.1	Solve multi-step problems and construct proofs involving angle measure, side length, diagonal length, perimeter, and area of squares, rectangles, parallelograms, kites, and trapezoids.	**Student Edition:** 62 Example 1a, 63 Example 2-Example 3, 64 #1, #12-#13, 65 #30, 66-69, 160, 239 #15, 364 *Are You Ready?* 51, 154 **Annotated Teacher's Edition:** CE 51 Quadrilaterals; DI 68; EL 66; I 66
G1.4.2	Solve multi-step problems and construct proofs involving quadrilaterals (e.g., prove that the diagonals of a rhombus are perpendicular) using Euclidean methods or coordinate geometry.	**Student Edition:** 66-69, 160 *Are You Ready?* 51, 154 *Review and Practice Your Skills* 78 Lesson 2-5 **Annotated Teacher's Edition:** AA 161; CE 51 Quadrilaterals; DI 51
G1.4.3	Describe and justify hierarchical relationships among quadrilaterals, (e.g. every rectangle is a parallelogram).	**Student Edition:** *Are You Ready?* 51, 154 **Annotated Teacher's Edition:** CE 51 Quadrilaterals; DI 51
G1.4.4	Prove theorems about the interior and exterior angle sums of a quadrilateral.	**Student Edition:** 354 #24, 355 #27
	G1.5 Other Polygons and Their Properties	
G1.5.1	Know and use subdivision or circumscription methods to find areas of polygons (e.g., regular octagon, non-regular pentagon).	**Student Edition:** 160-163 *MathWorks* 165 **Annotated Teacher's Edition:** AA 161; CE 161; LW 162
G1.5.2	Know, justify, and use formulas for the perimeter and area of a regular *n*-gon and formulas to find interior and exterior angles of a regular *n*-gon and their sums.	**Student Edition:** 160 **Annotated Teacher's Edition:** AA 161
	G1.6 Circles and Their Properties	
G1.6.1	Solve multi-step problems involving circumference and area of circles.	**Student Edition:** 80-83, 169 #31-#36 *Are You Ready?* 155 #11-#14 *Review and Practice Your Skills* 88 Lesson 2-7 **Annotated Teacher's Edition:** CE 81; EL 80, 81, 83; LW 82

STANDARDS		PAGE REFERENCES
G1.6.2	Solve problems and justify arguments about chords (e.g., if a line through the center of a circle is perpendicular to a chord, it bisects the chord) and lines tangent to circles (e.g., a line tangent to a circle is perpendicular to the radius drawn to the point of tangency).	This standard can be found in Glencoe's *MathMatters 2: An Integrated Program* © 2006 on the following pages: **Student Edition:** 226-229, 230, 231, 236, 237, 239, 281, 602 This standard also can be found in Glencoe's *MathMatters 3: An Integrated Program* © 2006 on the following pages: **Student Edition:** 441, 442 #1, 444 #21, 445 #12-#16
G1.6.3	Solve problems and justify arguments about central angles, inscribed angles and triangles in circles.	This standard can be found in Glencoe's *MathMatters 2: An Integrated Program* © 2006 on the following pages: **Student Edition:** 226-229, 230, 231, 232-233, 236, 237, 239, 247 #41, 285, 371 #15, 417, 469 #16 This standard also can be found in Glencoe's *MathMatters 3: An Integrated Program* © 2006 on the following pages: **Student Edition:** 440 ex 1, 443 #4, 444 #17, 445 #12-#16
G1.6.4	Know and use properties of arcs and sectors, and find lengths of arcs and areas of sectors.	Sectors associated with circles graphs are listed in the examples below. **Student Edition:** 20-21 *Review and Practice Your Skills* 22 Lesson 1-4 **Annotated Teacher's Edition:** CE 21, 23 Lesson 1-4
	G1.7 Conic Sections and Their Properties	
G.1.7.1	Find an equation of a circle given its center and radius; given the equation of a circle, find its center and radius.	**Student Edition:** 80-83, 169 #31-#36 *Are You Ready?* 155 #11-#14 *Review and Practice Your Skills* 88 Lesson 2-7 **Annotated Teacher's Edition:** CE 81; EL 80, 81, 83; LW 82
G1.7.2	Identify and distinguish among geometric representations of parabolas, circles, ellipses, and hyperbolas; describe their symmetries, and explain how they are related to cones.	**Student Edition:** 166-169, 175, 188-193 **Annotated Teacher's Edition:** CE 167, 189; DI 188; EL 167, 189; LW 168, 190

STANDARDS		PAGE REFERENCES
G1.7.3	Graph ellipses and hyperbolas with axes parallel to the x- and y-axes, given equations.	This standard can be found in Glencoe's *MathMatters 3: An Integrated Program* © 2006 on the following pages: **Student Edition:** 572-573, 574-577, 578 #1-#19, 579 #11-#14, 599 #39-#44, 605 #25-#26, 607 #13-#14
	G1.8 Three-Dimensional Figures	
G1.8.1	Solve multi-step problems involving surface area and volume of pyramids, prisms, cones, cylinders, hemispheres, and spheres.	**Student Edition:** 184-187, 188-193, 194-197, 239 #11 **Annotated Teacher's Edition:** AA 185, 195; CE 185, 189, 195; EL 184, 189, LW 186, 190; TT 192
G1.8.2	Identify symmetries of pyramids, prisms, cones, cylinders, hemispheres, and spheres.	**Student Edition:** 166-169, 175, 188-193 **Annotated Teacher's Edition:** CE 167, 189; DI 188; EL 167, 189; LW 168, 190
	STANDARD G2: RELATIONSHIPS BETWEEN FIGURES	
	Students use and justify relationships between lines, angles, area and volume formulas, and 2- and 3-dimensional representations. They solve problems and provide proofs about congruence and similarity.	
	G2.1 Relationships Between Area and Volume Formulas	
G2.1.1	Know and demonstrate the relationships between the area formula of a triangle, the area formula of a parallelogram, and the area formula of a trapezoid.	**Student Edition:** 66 #2-#4, 67, 69 #39-#40, 234 #10-#11 *Review and Practice Your Skills* 78 Lesson 2-4 **Annotated Teacher's Edition:** DI 68; I 66; LW 68; TT 193
G2.1.2	Know and demonstrate the relationships between the area formulas of various quadrilaterals (e.g., explain how to find the area of a trapezoid based on the areas of parallelograms and triangles).	**Student Edition:** 66 #2-#4, 67, 69 #39-#40, 234 #10-#11 *Review and Practice Your Skills* 78 Lesson 2-4 **Annotated Teacher's Edition:** DI 68; I 66; LW 68; TT 193
G2.1.3	Know and use the relationship between the volumes of pyramids and prisms (of equal base and height) and cones and cylinders (of equal base and height).	**Student Edition:** 188-189, 191 #32 *Review* 200 Lesson 4-7, Lesson 4-8 **Annotated Teacher's Edition:** DI 188; I 188; LW 168, 190; TT 192

STANDARDS	PAGE REFERENCES
G2.2 Relationships Between Two-dimensional and Three-dimensional Representations	
G2.2.1 Identify or sketch a possible 3-dimensional figure, given 2-dimensional views (e.g., nets, multiple views); create a 2-dimensional representation of a 3-dimensional figure.	**Student Edition:** 166 #1-#2, 167, 168 Example 4, #3-#9, #14-#17, 169 #28, 170-171, 175-177, 178-181 *Review and Practice Your Skills* 172 #9-#18 **Annotated Teacher's Edition:** 5MW 170; CE 167, 171, 185 #2; DI 173
G2.2.2 Identify or sketch cross-sections of 3-dimensional figures; identify or sketch solids formed by revolving 2-dimensional figures around lines.	**Student Edition:** 188
G2.3 Congruence and Similarity	
G2.3.1 Prove that triangles are congruent using the SSS, SAS, ASA, and AAS criteria, and for right triangles, the hypotenuse-leg criterion.	This standard can be found in Glencoe's *MathMatters 2: An Integrated Program* © 2006 on the following pages: **Student Edition:** 212-215, 220-221, 231, 234-236, 237, 238 #10, 239 #20, 309, 477, 535, 601 This standard can be found in Glencoe's *MathMatters 3: An Integrated Program* © 2006 on the following pages: **Student Edition:** 148-149, 154-157, 158 #14-#16, 159 #21-#22, 160-163, 169 #3-#5, 187 #26, 193 #17-#23, 195 #7-#8
G2.3.2 Use theorems about congruent triangles to prove additional theorems and solve problems, with and without use of coordinates.	This standard can be found in Glencoe's *MathMatters 2: An Integrated Program* © 2006 on the following pages: **Student Edition:** 212-215, 216-219, 220-221 This standard can be found in Glencoe's *MathMatters 3: An Integrated Program* © 2006 on the following pages: **Student Edition:** 148-149, 154-157, 158 #14-#16, 159 #21-#22, 160-163, 169 #3-#5, 187 #26, 193 #17-#23, 195 #7-#8

STANDARDS		PAGE REFERENCES
G2.3.3	Prove that triangles are similar by using SSS, SAS, and AA conditions for similarity.	This standard can be found in Glencoe's *MathMatters 2: An Integrated Program* © 2006 on the following pages: **Annotated Teacher's Edition:** AA 474; QA 476; TT 475, 483, 492 This standard also can be found in Glencoe's *MathMatters 3: An Integrated Program* © 2006 on the following pages: **Student Edition:** 148-149, 154-157, 158 #14-#16, 159 #21-#22, 160-163, 169 #3-#5, 187 #26, 193 #17-#23, 195 #7-#8
G2.3.4	Use theorems about similar triangles to solve problems with and without use of coordinates.	This standard can be found in Glencoe's *MathMatters 2: An Integrated Program* © 2006 on the following pages: **Student Edition:** 474-477, 478-481, 482-483, 488, 493, 503, 510, 513, 620, 631 #11 *Check Understanding* 475 *MathWorks* 483 This standard also can be found in Glencoe's *MathMatters 3: An Integrated Program* © 2006 on the following pages: **Student Edition:** 148-149, 154-157, 158 #14-#16, 159 #21-#22, 160-163, 169 #3-#5, 187 #26, 193 #17-#23, 195 #7-#8
G2.3.5	Know and apply the theorem stating that the effect of a scale factor of k relating one two dimensional figure to another or one three dimensional figure to another, on the length, area, and volume of the figures is to multiply each by k, k^2, and k^3, respectively.	**Student Edition:** 77 #67, 139 #60-#61 **Annotated Teacher's Edition:** EL 143; TT 155

STANDARDS		PAGE REFERENCES
STANDARD G3: TRANSFORMATIONS OF FIGURES IN THE PLANE		
Students will solve problems about distance-preserving transformations and shape-preserving transformations. The transformations will be described synthetically and, in simple cases, by analytic expressions in coordinates.		
G3.1 Distance-preserving Transformations: Isometries		
G3.1.1	Define reflection, rotation, translation, and glide reflection and find the image of a figure under a given isometry.	**Student Edition:** 370-373, 374-377, 381-383 *MathWorks* 379 *Review and Practice Your Skills* 378 **Annotated Teacher's Edition:** AA 374; CE 371, 375, 381; LW 376
G3.1.2	Given two figures that are images of each other under an isometry, find the isometry and describe it completely.	**Student Edition:** 380-383 *Assessment* 387 #19-#20, #23 *Review* 386 Lesson 8-7 **Annotated Teacher's Edition:** CE 381; I 380; LW 382; TT 381
G3.1.3	Find the image of a figure under the composition of two or more isometries, and determine whether the resulting figure is a reflection, rotation, translation, or glide reflection image of the original figure.	**Student Edition:** 380-383 *Assessment* 387 #19-#20, #23 *Review* 386 Lesson 8-7 **Annotated Teacher's Edition:** CE 381; I 380; LW 382; TT 381
G3.2 Shape-preserving Transformations: Dilations and Isometries		
G3.2.1	Know the definition of dilation, and find the image of a figure under a given dilation.	This standard can be found in Glencoe's *MathMatters 2: An Integrated Program* © 2006 on the following pages: **Student Edition:** 316-319, 326, 327, 609 This standard also can be found in Glencoe's *MathMatters 3: An Integrated Program* © 2006 on the following pages: **Student Edition:** 348-351, 356 #1-#10, 357 #25-#26, 367 #64, 375 #17-#18, 377 #4, 379 #20

STANDARDS		PAGE REFERENCES
G3.2.2	Given two figures that are images of each other under some dilation, identify the center and magnitude of the dilation.	This standard can be found in Glencoe's *MathMatters 2: An Integrated Program* © 2006 on the following pages: **Student Edition:** 316-319, 326, 327, 371 #18, 609 This standard also can be found in Glencoe's *MathMatters 3: An Integrated Program* © 2006 on the following pages: **Student Edition:** 348-351, 356 #1-#10, 357 #25-#26, 367 #64, 375 #17-#18, 377 #4, 379 #20
	STRAND 4: STATISTICS AND PROBABILITY	
	In Kindergarten through Grade 8, students develop the ability to read, analyze, and construct a repertoire of statistical graphs. Students also examine the fundamentals of experimental and theoretical probability in informal ways. The Basic Counting Principle and tree diagrams serve as tools to solve simple counting problems in these grades. During high school, students build on that foundation. They develop the data interpretation and decision-making skills that will serve them in their further study of mathematics as well as in their coursework in the physical, biological, and social sciences. Students learn important skills related to the collection, display, and interpretation of both univariate and bivariate data. They understand basic sampling methods and apply principles of effective data analysis and data presentation. These skills are also highly valuable outside of school, both in the workplace and in day-to-day life. In probability, students utilize probability models to calculate probabilities and make decisions. The normal distribution and its properties are studied. Students then use their understanding of probability to make decisions, solve problems, and determine whether or not statements about probabilities of events are reasonable. Students use technology when appropriate, including spreadsheets. This strong background in statistics and probability will enable students to be savvy decision-makers and smart information-consumers and producers who have a full range of tools in order to make wise choices.	
	STANDARD S1: UNIVARIATE DATA – EXAMINING DISTRIBUTIONS	
	Students plot and analyze univariate data by considering the shape of distributions and analyzing outliers; they find and interpret commonly-used measures of center and variation; and they explain and use properties of the normal distribution.	
	S1.1 Producing and Interpreting Plots	
S1.1.1	Construct and interpret dot plots, histograms, relative frequency histograms, bar graphs, basic control charts, and box plots with appropriate labels and scales; determine which kinds of plots are appropriate for different types of data; compare data sets and interpret differences based on graphs and summary statistics.	**Student Edition:** 16-19, 24-27, 28-31, 34-37, 38-41, 145 #71-#74 **Annotated Teacher's Edition:** CE 17, 20, 25, 29; EL 24; LW 30

STANDARDS		PAGE REFERENCES
S1.1.2	Given a distribution of a variable in a data set, describe its shape, including symmetry or skewness, and state how the shape is related to measures of center (mean and median) and measures of variation (range and standard deviation) with particular attention to the effects of outliers on these measures.	**Student Edition:** 10-13, 38-41, 145 #73-#74 *MathWorks* 33 #5 *Review and Practice Your Skills* 14 **Annotated Teacher's Edition:** CE 11, 15, 139; EL 10, 11; I 38; LW 12
	S1.2 Measures of Center and Variation	
S1.2.1	Calculate and interpret measures of center including: mean, median, and mode; explain uses, advantages and disadvantages of each measure given a particular set of data and its context.	**Student Edition:** 10-13, 38-41, 145 #73-#74 *MathWorks* 33 #5 *Review and Practice Your Skills* 14 **Annotated Teacher's Edition:** CE 11, 15, 139; EL 10, 11; I 38; LW 12
S1.2.2	Estimate the position of the mean, median, and mode in both symmetrical and skewed distributions, and from a frequency distribution or histogram.	Estimation can be used with the following examples. **Student Edition:** 10-13, 24-27, 38-41, 145 #73-#74 *MathWorks* 33 #5 *Review and Practice Your Skills* 14 **Annotated Teacher's Edition:** CE 11, 15, 139; EL 10, 11; I 38; LW 12
S1.2.3	Compute and interpret measures of variation, including percentiles, quartiles, interquartile range, variance, and standard deviation.	**Student Edition:** 20-23, 38-41, 260-263, 264-267 *MathWorks* 289 **Annotated Teacher's Edition:** CE 39; EL 10, 20, 39; I 38; TT 260
	S1.3 The Normal Distribution	
S1.3.1	Explain the concept of distribution and the relationship between summary statistics for a data set and parameters of a distribution.	While distribution is not specifically mentioned in the text, this concept could be taught with the following examples. **Student Edition:** 10-13, 38-41, 145 #73-#74 *MathWorks* 33 #5 *Review and Practice Your Skills* 14 **Annotated Teacher's Edition:** CE 11, 15, 139; EL 10, 11; I 38; LW 12

STANDARDS		PAGE REFERENCES
S1.3.2	Describe characteristics of the normal distribution, including its shape and the relationships among its mean, median, and mode.	Normal distribution could be taught with the following examples. **Student Edition:** 10-13, 38-41, 145 #73-#74 *MathWorks* 33 #5 *Review and Practice Your Skills* 14 **Annotated Teacher's Edition:** CE 11, 15, 139; EL 10, 11; I 38; LW 12
S1.3.3	Know and use the fact that about 68%, 95%, and 99.7% of the data lie within one, two, and three standard deviations of the mean, respectively in a normal distribution.	This standard can be found in Glencoe's *MathMatters 3: An Integrated Program* © 2006 on the following pages: **Student Edition:** 412-415, 418 #37-#40, 419 #11-#12
S1.3.4	Calculate z-scores, use z-scores to recognize outliers, and use z-scores to make informed decisions.	While not covered in this text, z-scores could be introduced to the student when the following examples are covered. **Student Edition:** 16-19 **Annotated Teacher's Edition:** CE 17
	STANDARD S2: BIVARIATE DATA – EXAMINING RELATIONSHIPS	
	Students plot and interpret bivariate data by constructing scatterplots, recognizing linear and nonlinear patterns, and interpreting correlation coefficients; they fit and interpret regression models, using technology as appropriate.	
	S2.1 Scatterplots and Correlation	
S2.1.1	Construct a scatterplot for a bivariate data set with appropriate labels and scales.	**Student Edition:** 34-37 **Annotated Teacher's Edition:** CE 35
S2.1.2	Given a scatterplot, identify patterns, clusters, and outliers; recognize no correlation, weak correlation, and strong correlation.	**Student Edition:** 35-37, 83 #44-#46, 340 Example 3, #9-#11, 341 #25-#27 **Annotated Teacher's Edition:** CE 35, 339 #3; EL 35; LW 36

STANDARDS		PAGE REFERENCES
S2.1.3	Estimate and interpret Pearson's correlation coefficient for a scatterplot of a bivariate data set; recognize that correlation measures the strength of linear association.	Pearson's correlation coefficient is not presented in this text, but it could be taught with the following examples. **Student Edition:** 34-37, 83 #44-#46, 340 Example 3, #9-#11, 341 #25-#27 **Annotated Teacher's Edition:** CE 35; EL 35; LW 36; TT 34
S2.1.4	Differentiate between correlation and causation; know that a strong correlation does not imply a cause-and-effect relationship; recognize the role of lurking variables in correlation.	**Student Edition:** 35-37, 83 #44-#46, 340 Example 3, #9-#11, 341 #25-#27 **Annotated Teacher's Edition:** CE 35, 339 #3; EL 35; LW 36
	S2.2 Linear Regression	
S2.2.1	For bivariate data which appear to form a linear pattern, find the least squares regression line by estimating visually and by calculating the equation of the regression line; interpret the slope of the equation for a regression line.	The equation of lines for the following bivariate data could be taught with the following examples. **Student Edition:** 340 Example 3, #9-#11, 341 #25-#27 **Annotated Teacher's Edition:** CE 339 #3
S2.2.2	Use the equation of the least squares regression line to make appropriate predictions.	Making predictions for equation of the least squares regression lines could be taught with the following examples. **Student Edition:** 340 Example 3, #9-#11, 341 #25-#27 **Annotated Teacher's Edition:** CE 339 #3
	STANDARD S3: SAMPLES, SURVEYS, AND EXPERIMENTS	
	Students understand and apply sampling and various sampling methods, examine surveys and experiments, identify bias in methods of conducting surveys, and learn strategies to minimize bias. They understand basic principles of good experimental design.	
	S3.1 Data Collection and Analysis	
S3.1.1	Know the meanings of a sample from a population and a census of a population, and distinguish between sample statistics and population parameters.	**Student Edition:** 446-449, 450 *Review and Practice Your Skills* 457 Lesson 10-3 **Annotated Teacher's Edition:** CE 447, 457; DI 456; LW 448; TT 446, 447

STANDARDS		PAGE REFERENCES
S3.1.2	Identify possible sources of bias in data collection and sampling methods and simple experiments; describe how such bias can be reduced and controlled by random sampling; explain the impact of such bias on conclusions made from analysis of the data; and know the effect of replication on the precision of estimates.	**Student Edition:** 443 #30-#31, 464-467 **Annotated Teacher's Edition:** EL 460, 466; I 440; LW 466; TT 441
S3.1.3	Distinguish between an observational study and an experimental study, and identify, in context, the conclusions that can be drawn from each.	**Student Edition:** 436-439, 440-443 **Annotated Teacher's Edition:** AA 442; CE 441 #2-#3; EL 439; FG 436, 440; I 440; LW 438, 442
	STANDARD S4: PROBABILITY MODELS AND PROBABILITY CALCULATION	
	Students understand probability and find probabilities in various situations, including those involving compound events, using diagrams, tables, geometric models and counting strategies; they apply the concepts of probability to make decisions.	
	S4.1 Probability	
S4.1.1	Understand and construct sample spaces in simple situations (e.g., tossing two coins, rolling two number cubes and summing the results).	**Student Edition:** 446-449, 450 *Review and Practice Your Skills* 457 Lesson 10-3 **Annotated Teacher's Edition:** CE 447, 457; DI 456; LW 448; TT 446, 447
S4.1.2	Define mutually exclusive events, independent events, dependent events, compound events, complementary events and conditional probabilities; and use the definitions to compute probabilities.	**Student Edition:** 456-459, 460-461 *MathWorks* 463 *Review and Practice Your Skills* 462 **Annotated Teacher's Edition:** CE 457; EL 458, 461; I 456; LW 458
	S4.2 Application and Representation	
S4.2.1	Compute probabilities of events using tree diagrams, formulas for combinations and permutations, Venn diagrams, or other counting techniques.	**Student Edition:** 450-453, 492-497 **Annotated Teacher's Edition:** AA 494; CE 451, 493; DI 450, 492; LW 452; TT 451, 452

STANDARDS	PAGE REFERENCES
S4.2.2 Apply probability concepts to practical situations, in such settings as finance, health, ecology, or epidemiology, to make informed decisions.	**Student Edition:** 443 #26-#27, #29, 453 #36-#42, 459 #54, 460-461, 466 #13, 467 #16 *MathWorks* 445, 463 **Annotated Teacher's Edition:** CE 461; EL 461