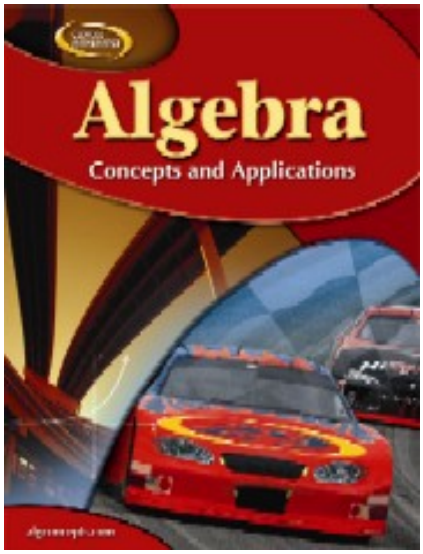
Mc Graw Hill Glencoe

Content Expectations for
Algebra 1
High School



Algebra

Concepts and Applications
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	STANDARDS	PAGE REFERENCES
	STANDARD L1: REASONING ABOUT NUMBERS, SYSTEMS, AND QUANTITATIVE LITERACY	
	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:** 8-13, 14-18 #27, 19-23, 26, 74 #49, 94-99, 100-103, 158 #50, 614-619, 620-623 **Teacher Wraparound Edition:** ICE 16 **Teacher Resources:** *Enrichment* 10, 20
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:** 64-69, 70-74, 154-159
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:** 8-13, 14-18, 19-23, 64-69, 70-74, 75-79, 82-85, 165-169, 171-175, 176-179, 388-393, 394-398, 399-404, 405-409, 428-433 *Hands-On Algebra* 66, 388, 400
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:** 75-79, 140-145 *Hands-On Algebra* 141 **Teacher Wraparound Edition:** OEA 79; RA 77, 142; TT 76

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

STANDARDS		PAGE REFERENCES
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:** 85 #46, 145 #48, 158 #50, 165-170, 193 #53, Introduction on 336, 340 #44, 358, 361 #45, 470 Ex 4, 568 Ex 4, 571 #36-#37 **Teacher Resources:** *Enrichment* 254, 412
	L1.2 Representations and Relationships	
L1.2.2	Interpret representations that reflect absolute value relationships (e.g. $\lvert x - a \rvert \leq b$, *or* $a \pm b$) in such contexts as error tolerance.	**Student Edition:** 128-131 #33-#34, 530-534 #42-#44 **Teacher Resources:** *Enrichment* 129
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:** 200 Ex 6 *Investigation* 210-211
	STANDARD L2: CALCULATION, ALGORITHMS, AND ESTIMATION	
	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:** 204-209 **Teacher Resources:** *Enrichment* 179
L2.1.2	Calculate fluently with numerical expressions involving exponents. Use the rules of exponents, and evaluate numerical expressions involving rational and negative exponents, and transition easily between roots and exponents.	**Student Edition:** 336-340, 341-345, 347-351, 352-356, 366-371 *Math in the Workplace* 346 **Teacher Resources:** *Enrichment* 343, 353, 358
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.	See Glencoe's *Algebra 2* © 2008 **Student Edition:** 528-533
L2.1.4	Know that the complex number i is one of two solutions to $x^2 = -1$.	See Glencoe's *Algebra 2* © 2008 **Student Edition:** 259-265
L2.1.5	Add, subtract, and multiply complex numbers. Use conjugates to simplify quotients of complex numbers.	See Glencoe's *Algebra 2* © 2008 **Student Edition:** 259-265

STANDARDS		PAGE REFERENCES
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:** 315 #39, 362-365 **Teacher Resources:** *Enrichment* 365
	STANDARD L3: MEASUREMENT AND PRECISION	
	L3.1 Measurement Units, Calculations, and Scales	
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.	See Glencoe's *Algebra 2* © 2008 **Student Edition:** 509-556
	STANDARD A1: EXPRESSIONS, EQUATIONS, AND INEQUALITIES	
	A1.1 Construction, Interpretation, and Manipulation of Expressions (linear, quadratic, polynomial, rational, power, exponential, and logarithmic)	
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:** 4-7, 8-13, 64-69, 70-74, 75-79, 82-85, 94-99, 100-103, 112-116 **Teacher Wraparound Edition:** EC 7
A1.1.2	Know the definitions and properties of exponents and roots and apply them in algebraic expressions.	**Student Edition:** 336-340, 341-343, 347-351, 352-356, 357-361, 362-365, 366-371, 388-393, 394-398, 399-404 *Graphing Calculator Exploration* 338-339 **Teacher Wraparound Edition:** EC 365 **Teacher Resources:** *Enrichment* 343, 353, 368
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:** 420-425, 428-433, 434-439, 440-444, 445-449 *Hands-On Algebra* 428, 434-435, 440 **Teacher Wraparound Edition:** EC 444; FA 437
A1.1.6	Use the properties of exponents and logarithms, including the inverse relationship between exponents and logarithms, to transform exponential and logarithmic expressions into equivalent forms.	See Glencoe's *Algebra 2* © 2008 **Student Edition:** 509-556

STANDARDS		PAGE REFERENCES
A1.2 Solutions of Equations and Inequalities (linear, exponential, logarithmic, quadratic, power, polynomial, and rational)		
A1.2.1	Write and solve equations and inequalities with one or two variables to represent mathematical or applied situations.	**Student Edition:** 112-116, 117-121, 122-127, 160-164, 165-170, 171-175, 176-179, 188-193, 194-197, 198-203, 204-209, 212-217, 504-508, 509-513, 514-518, 519-523 *Graphing Calculator Exploration* 167
A1.2.2	Associate a given equation with a function whose zeros are the solutions of the equation.	**Student Edition:** 468-473
A1.2.3	Solve linear and quadratic equations and inequalities, including systems of up to three linear equations with three unknowns. Justify steps in the solutions, and apply the quadratic formula appropriately.	**Student Edition:** 468-473, 474-477, 478-482, 483-487, 550-553, 554-559, 560-565, 566-571, 572-577, 580-585, 586-590 *Graphing Calculator Exploration* 551 *Hands-On Algebra* 560 *Investigation* 578 *Math in the Workplace* 591
A1.2.4	Solve absolute value equations and inequalities (e.g., solve $\lvert x - 3 \rvert \leq 6$) and justify.	**Student Edition:** 128-131, 145 #49-#51, 193 #64, 301 #57, 530-534 *Investigation* 540-541
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:** 624-629 *Graphing Calculator Exploration* 625 **Teacher Wraparound Edition:** EC 629 **Teacher Resources:** *Enrichment* 487
A1.2.8	Solve an equation involving several variables (with numerical or letter coefficients) for a designated variable. Justify steps in the solution.	**Student Edition:** 244-249, 250-255, 290-295, 296-301, 310-315

STANDARDS		PAGE REFERENCES
STANDARD A2: FUNCTIONS		
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:** 238-243, 244-249, 256-261, 289 #30, 425 #68, 489-493 *Investigation* 262-263 **Teacher Wraparound Edition:** EC 243; FA 258
A2.1.2	Read, interpret, and use function notation and evaluate a function at a value in its domain.	**Student Edition:** 256-261 **Teacher Wraparound Edition:** EC 261; FA 258 **Teacher Resources:** *Enrichment* 264
A2.1.3	Represent functions in symbols, graphs, tables, diagrams, or words and translate among representations.	**Student Edition:** 238-243, 244-249, 250-255, 256-261, 264-269, 270-275, 458-463, 489-493 *Graphing Calculator Exploration* 471 *Investigation* 262-263 **Teacher Wraparound Edition:** EC 269; FA 258
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:** 493 #32 *Graphing Calculator Exploration* 317 **Teacher Resources:** *Enrichment* 259, 552
A2.1.5	Recognize that functions may be defined recursively. Compute values of and graph simple recursively defined functions (e.g., $f(0) = 5$, and $f(n) = f(n\text{-}1) + 2$).	**Student Edition:** *Investigation* 110-111
A2.1.6	Identify the zeros of a function and the intervals where the values of a function are positive or negative. Describe the behavior of a function as x approaches positive or negative infinity, given the symbolic and graphical representations.	**Student Edition:** 468-473, 475 Ex 2

STANDARDS		PAGE REFERENCES
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, and average rate of change over an interval).	**Student Edition:** 284-289, 296-301, 302-307, 310-315, 316-321, 322-327, 458-463, 468-473 *Graphing Calculator Exploration* 317, 471
	A2.2 Operations and Transformations	
A2.2.1	Combine functions by addition, subtraction, multiplication, and division.	See Glencoe's *Algebra 2* © 2008 **Student Edition:** 384-390
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:** 69 #61-#62, 77 Ex 9, 78 #13, 79 #49 **Teacher Resources:** *Enrichment* 482
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 $g(x) = x^{1/3}$).	See Glencoe's *Algebra 2* © 2008 **Student Edition:** 391-396
	A2.3 Families of Functions (linear, quadratic, polynomial, power, exponential, and logarithmic)	
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:** 316-321, 464-467 *Graphing Calculator Exploration* 317
A2.3.2	Describe the tabular pattern associated with functions having constant rate of change (linear) or variable rates of change.	**Student Edition:** 250-255, 264-269, 270-275, 284-289, 458-463
	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:** 290-295, 296-301, 322-327 *Investigation* 308-309 **Teacher Wraparound Edition:** EC 301; FA 300; RA 293, 299 **Teacher Resources:** *Enrichment* 308

STANDARDS		PAGE REFERENCES
A2.4.2	Graph lines (including those of the form $x = h$ and $y = k$) given appropriate information.	**Student Edition:** 250-255, 310-315, 316-321 *Graphing Calculator Exploration* 317 **Teacher Wraparound Edition:** EC 321
A2.4.3	Relate the coefficients in a linear function to the slope and *x*- and *y*-intercepts of its graph.	**Student Edition:** 310-315 **Teacher Wraparound Edition:** EC 315
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 nonvertical parallel lines have equal slopes and that nonvertical perpendicular lines have slopes that multiply to give -1.	**Student Edition:** 322-327 *Hands-On Algebra* 324 **Teacher Wraparound Edition:** EC 327
	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 $f(x) = 4\ (1.5)^x$).	**Student Edition:** 489-493 *Graphing Calculator Exploration* 491
A2.5.4	Understand and use the fact that the base of an exponential function determines whether the function increases or decreases and how base affects the rate of growth or decay.	**Student Edition:** 489-493 *Investigation* 494-495 **Teacher Resources:** *Enrichment* 507
A2.5.5	Relate exponential and logarithmic functions to real phenomena, including half-life and doubling time.	**Student Edition:** Does not include logarithms 489-493 *Investigation* 494-495 **Teacher Resources:** *Enrichment* 507
	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.).	**Student Edition:** 458-463, 464-467, 468-473 *Graphing Calculator Exploration* 471

STANDARDS		PAGE REFERENCES
A2.6.2	Identify the elements of a parabola (vertex, axis of symmetry, and 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:** 458-463, 464-467 **Teacher Wraparound Edition:** RA 461
A2.6.3	Convert quadratic functions from standard to vertex form by completing the square.	**Student Edition:** 478-482 *Hands-On Algebra* 478-479
A2.6.4	Relate the number of real solutions of a quadratic equation to the graph of the associated quadratic function.	**Student Edition:** 468-473, 475 Ex 2, 477 #35 *Graphing Calculator Exploration* 471
A2.6.5	Express quadratic functions in vertex form to identify their maxima or minima and in factored form to identify their zeros.	**Student Edition:** 458-463
	A2.7 Power Functions (including roots, cubics, quartics, etc.)	
A2.7.1	Write the symbolic form and sketch the graph of power functions.	The following page references are power functions with a power of 2. **Student Edition:** 464 Ex 1, 466 #1, #4, #5, #10, #17, #18 Also see Glencoe's *Advanced Mathematical Concepts: Precalculus with Applications* © 2006 **Student Edition:** 704
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).	**Student Edition:** 264-275
A2.7.3	Analyze the graphs of power functions, noting reflectional or rotational symmetry.	Reflectional symmetry is found on page **Student Edition:** 459
	A2.8 Polynomial Functions	
A2.8.1	Write the symbolic form and sketch the graph of simple polynomial functions.	**Teacher Resources:** *Enrichment* 487
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.	See Glencoe's *Algebra 2* © 2008 **Student Edition:** 339-345, 473-478

STANDARDS		PAGE REFERENCES
A2.8.3	Determine the maximum possible number of zeroes of a polynomial function and understand the relationship between the *x*-intercepts of the graph and the factored form of the function.	See Glencoe's *Algebra 2* © 2008 **Student Edition:** 362-368
	STANDARD A3: MATHEMATICAL MODELING	
	A3.1 Models of Real-world Situations Using Families of Functions (linear, quadratic, exponential and power) *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 or exponential functions for compound interest. *In the example above, recognize that the appropriate general function is exponential* ($P = P_0a^t$)].	**Student Edition:** 253 Ex 8, 255 #40, 266 Ex 4, 273 Ex 3, 298 Ex 6, 300 #46-#47, 315 #39, 463 #43, 467 #27-#28, 472 #25, 473 #26, 477 #32-#34, 489-493 *Investigation* 262-263, 494-495 **Teacher Wraparound Edition:** RA 492 **Teacher Resources:** *Enrichment* 493
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:** 253 Ex 8, 255 #40, 266 Ex 4, 273 Ex 3, 298 Ex 6, 300 #46-#47, 315 #39, 460 Ex 4, 481 #35, 482 #40 & #43, 490 Ex 4, 492-493 #22-#24 *Investigation* 262-263, 494-495
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:** 315 #39, 480 Ex 3, 484 Ex 3, 486 #27, 493 #24

STANDARDS		PAGE REFERENCES
STANDARD S2: BIVARIATE DATA-EXAMINING RELATIONSHIPS		
S2.1 Scatterplots and Correlation		
S2.1.1	Construct a scatterplot for a bivariate data set with appropriate labels and scales.	**Student Edition:** 302-307 *Investigation* 308-309 **Teacher Wraparound Edition:** RA 304 **Teacher Resources:** *Enrichment* 308
S2.1.2	Given a scatterplot, identify patterns, clusters, and outliers. Recognize no correlation, weak correlation, and strong correlation.	**Student Edition:** 302-307
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.	See Glencoe's *Algebra 2* © 2008 **Student Edition:** 92-93
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.	This standard can be met during teacher/class discussion.
S2.2 Linear Regression		
S2.2.1	For bivariate data that 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.	**Student Edition:** *Investigation* 308-309 (without the least squares terminology)
S2.2.2	Use the equation of the least squares regression line to make appropriate predictions.	This standard can be met during teacher/class discussion.