



McDougal Littell

Algebra 2

Concepts and Skills

correlated to the

Michigan High School Content Expectations

Algebra II



McDougal Littell
***Algebra 2: Concepts and Skills* ©2008**

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High School Content Expectations
Algebra II

STANDARD L1:
REASONING ABOUT NUMBERS, SYSTEMS AND QUANTITATIVE SITUATIONS

L1.2 *Representations and Relationships*

L1.2.1 Use mathematical symbols to represent quantitative relationships and situations.

PE/TE: 73-74, 76, 192-194, 195-197, 198-200, 201-203, 261-263, 264-266, 353-355, 356-358,
359-361, 362-364, 373-375, 376-378, 433-435, 436-439, 440, 441, 442-444, 445-447,
606-607, 608-610, 611, 616-617, 618

L1.3 *Counting and Probabilistic Reasoning*

L1.3.1 Describe, explain and apply various counting techniques;
relate combinations to Pascal's triangle;
know when to use each technique.

PE/TE: 539-541, 542-544, 545-548, 548-551, 552, 553-555, 557, 560-561, 577, 579, 581, 592,
620, 702, 740, 787, 793

L1.3.2 Define and interpret commonly used expressions of probability.

PE/TE: 556

L1.3.3 Recognize and explain common probability misconceptions such as “hot streaks” and “being due.”

PE/TE: *The opportunity to address this standard can be found on pages:*

569-571, 572-574

STANDARD L2: CALCULATION, ALGORITHMS AND ESTIMATION

L2.1 *Calculation Using Real and Complex Numbers*

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.

PE/TE: 433-434, 436-438, 439, 442, 447

L2.1.5 Add, subtract and multiply complex numbers; use conjugates to simplify quotients of complex numbers.

PE/TE: 262-263, 264-265, 266, 273, 287, 289, 291, 321, 349, 782, 791

L2.2 *Sequences and Iteration*

L2.2.1 Find the *n*th term in arithmetic, geometric or other simple sequences.

PE/TE: 609, 611-613, 616-617, 618-620, 622-623, 624-626, 637-638, 639, 641, 658, 666, 674, 740, 788, 793

L2.2.2 Compute sums of finite arithmetic and geometric sequences.

PE/TE: 610, 611-613, 614, 617, 618-620, 623, 625-626, 628, 631, 634, 637-638, 639, 641, 788, 793

L2.2.3 Use iterative processes in such examples as computing compound interest or applying approximation procedures.

PE/TE: 9, 411, 416

L2.3 *Measurement Units, Calculations and Scales*

L2.3.2 Describe and interpret logarithmic relationships in such contexts as the Richter scale, the *pH* scale or decibel measurements; solve applied problems.

PE/TE: 437-438, 444, 446, 453, 461

L2.4 *Understanding Error*

L2.4.1 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.

PE/TE: *This standard is outside the scope of Algebra 2: Concepts and Skills*

L2.4.2 Describe and explain round-off error, rounding and truncating.

PE/TE: *This standard is outside the scope of Algebra 2: Concepts and Skills*

L2.4.3 Know the meaning of and interpret statistical significance, margin of error and confidence level.

PE/TE: 528, 529, 531-532, 576, 579, 581

STANDARD A1: EXPRESSIONS, EQUATIONS AND INEQUALITIES

A1.1 *Construction, Interpretation and Manipulation of Expressions*

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.

PE/TE: 8, 10-11, 12-14, 18, 20, 28, 31, 35, 37-38, 40-42, 43-45, 58, 60, 61, 62-63, 72, 74-75, 76, 85, 113, 166, 176, 203, 334, 774

A1.1.4 Add, subtract, multiply and simplify polynomials and rational expressions.

PE/TE: 310-311, 312-314, 315-317, 318-321, 334, 342-343, 345, 346-347, 349, 378, 373-374, 376, 386, 403, 405, 480-482, 483-485, 486-488, 489-492, 493, 494-496, 497-499, 506, 508-509, 511, 512-513, 515, 532, 783, 786, 792

A1.1.5 Divide a polynomial by a monomial.

PE/TE: 324-325, 326-328, 329-331, 332-333, 343-344, 345, 400, 485, 783

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.

PE/TE: 295, 296-298, 299-301, 308, 341, 345, 346, 349, 355, 356-357, 359-361, 362-364, 371, 402, 405, 406-407, 432, 433-434, 436-437, 439, 441, 442-444, 445-447, 451, 452-453, 454, 457-458, 459, 461

A1.2 *Solutions of Equations and Inequalities*

A1.2.2 Associate a given equation with a function whose zeros are the solutions of the equation.

PE/TE: 242-243, 277, 282, 284, 327, 333-334, 338

A1.2.5 Solve polynomial equations and equations involving rational expressions and justify steps in the solution.

PE/TE: 325, 326-327, 330-331, 332-334, 340, 343-344, 345, 347, 349, 500-502, 503-505, 506, 510, 511, 513, 515, 524, 658, 786, 792

A1.2.7 Solve exponential and logarithmic equations and justify steps in the solution.

PE/TE: 448-451, 452-453, 454, 458, 459, 461, 499, 515, 785, 792

A1.2.8 Solve an equation involving several variables (*with numerical or letter coefficients*) for a designated variable and justify steps in the solution.

PE/TE: 33-35, 36-39, 59, 61, 88, 92, 130, 159, 378, 454, 778

A1.2.9 Know common formulas and apply appropriately in contextual situations.

PE/TE: 33-34, 37-38, 39, 40, 43, 59, 61, 79, 81, 84, 236, 238, 245-246, 251, 253, 257, 260, 270, 272, 277, 279-280, 289, 298, 300, 691-693, 694-696, 753-755, 757, 768, 798

A1.2.10 Use special values of the inverse trigonometric functions to solve trigonometric equations over specific intervals.

PE/TE: *This standard is outside the scope of **Algebra 2: Concepts and Skills**.*

STANDARD A2: FUNCTIONS

A2.1 *Definitions, Representations and Attributes of Functions*

A2.1.1 Determine whether a relationship (*given in contextual, symbolic, tabular or graphical form*) is a function, and identify its domain and range.

PE/TE: 67-68, 70-72, 74, 77, 85, 115, 119, 120, 382, 383-384, 411, 412, 414, 415, 417, 419-421, 422-423, 425, 435, 455-457, 459, 471, 472-473, 475-476, 478, 514, 613, 626, 779, 785, 786

A2.1.2 Read, interpret and use function notation and evaluate a function at a value in its domain.

PE/TE: 73-75, 76-78, 85, 105, 113, 116, 119, 120-121, 166, 203, 209, 334, 335-336, 338-340, 373-375, 376-378, 386, 417, 425, 514, 609, 716, 781, 783, 784

A2.1.3 Represent functions in symbols, graphs, tables, diagrams or words and translate among representations.

PE/TE: 67-69, 70-72, 73-75, 76-78, 85, 86, 92, 93, 94-96, 97-100, 106, 114, 115-118, 119, 120-121, 152, 166-167, 204-206, 207-209, 417, 425, 437, 439, 514-515, 613, 740-741, 779, 781, 792

A2.1.6 Identify the zeros of a function, the intervals where the values of a function are positive or negative and describe the behavior of a function as x approaches positive or negative infinity, given the symbolic and graphical representations.

PE/TE: 242-243, 244-246, 248, 277, 286, 303-304, 305-307, 309, 325, 326-328, 330-331, 332-333, 336, 338-339, 340, 344, 345, 476-477, 627, 629-630, 631-633

A2.1.7 Identify and interpret the key features of a function from its graph or its formula(s).

PE/TE: 222-223, 225-227, 228-230, 231-233, 239, 242-243, 244-245, 247, 248, 285-286, 289, 411, 412, 414, 415, 417, 419-421, 422-424, 425, 435, 437, 472-474, 475-477, 479, 508, 511, 661-662, 663-665, 667, 683

A2.2 *Operations and Transformations with Functions*

A2.2.1 Combine functions by addition, subtraction, multiplication and division.

PE/TE: 373-374, 376-378, 386, 403, 405, 406, 425, 454, 514, 784

A2.2.2 Apply given transformations to parent functions, and represent symbolically.

PE/TE: 205-206, 207-209, 210, 211, 214, 215, 221, 222, 388-394, 413-414, 415-417, 420-421, 423-424, 425, 432, 455-457, 459, 460, 475-476, 724-726, 728-730, 731, 732, 736, 737, 739, 781, 782, 785, 786, 790

A2.2.3 Recognize whether a function (*given in tabular or graphical form*) has an inverse and recognize simple inverse pairs.

PE/TE: 379, 380-382, 383-386, 387, 400, 403, 405, 406, 435, 514, 605, 716, 784

A2.3 *Representations of Functions*

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.

PE/TE: 412-414, 415, 417, 420-421, 422, 425, 422, 425, 430-431, 435, 437, 439, 455-457, 459, 472-474, 475-477, 478, 479, 662, 664

A2.3.3 Write the general symbolic forms that characterize each family of functions.

PE/TE: 73, 87-88, 90, 94, 97, 101, 103, 118, 222-223, 228-229, 302-303, 389-390, 411, 412-413, 415, 417, 419, 426-427, 431, 435, 472-473, 661-662

A2.4 *Models of Real-World Situations Using Families of Functions*

A2.4.1 Identify the family of functions best suited for modeling a given real-world situation.

PE/TE: 427, 431, 466, 469

A2.4.2 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.

PE/TE: 257, 259, 273, 277, 279-280, 289, 291, 426-429, 430-432

A2.4.3 Using the adapted general symbolic form, draw reasonable conclusions about the situation being modeled.

PE/TE: 257, 259, 273, 277, 279-280, 289, 291, 426-429, 430-432

STANDARD A3: FAMILIES OF FUNCTIONS

A3.2 *Exponential and Logarithmic Functions*

A3.2.2 Interpret the symbolic forms and recognize the graphs of exponential and logarithmic functions.

PE/TE: 412-413, 415, 419-420, 422, 424-425, 426, 430, 435, 437-438, 439, 440, 455-457, 459, 460, 467, 785

A3.2.3 Apply properties of exponential and logarithmic functions.

PE/TE: 414, 415-416, 418, 421, 423-425, 426-429, 430-432, 437-438, 439, 444, 446, 451, 452-453, 459, 461, 515, 740, 785

A3.6 *Rational Functions*

A3.6.1 Write the symbolic form and sketch the graph of simple rational functions.

PE/TE: 466-467, 469-470, 472-474, 475-477, 478, 479, 493, 507-508, 511, 512-513, 515, 613, 716, 786, 792

A3.6.2 Analyze graphs of simple rational functions and understand the relationship between the zeros of the numerator and denominator and the function's intercepts, asymptotes and domain.

PE/TE: 472-474, 475-477, 478, 479, 493, 508, 511, 512-513, 613, 716, 786, 792

A3.7 *Trigonometric Functions*

A3.7.1 Use the unit circle to define sine and cosine;
approximate values of sine and cosine;
use sine and cosine to define the remaining trigonometric functions;
explain why the trigonometric functions are periodic.

PE/TE: 653-655, 656-658, 659, 660, 683, 685

A3.7.2 Use the relationship between degree and radian measures to solve problems.

PE/TE: *This standard is outside the scope of **Algebra 2: Concepts and Skills**.*

A3.7.3 Use the unit circle to determine the exact values of sine and cosine, for integer multiples of $\pi/6$ and $\pi/4$.

PE/TE: *This standard can be developed from the material on pages:*

651, 652-655, 683

A3.7.4 Graph the sine and cosine functions; analyze graphs by noting domain, range, period, amplitude and location of maxima and minima.

PE/TE: 659, 660-662, 663-665, 666, 667, 683, 685, 686-687, 708, 741, 789

A3.7.5 Graph transformations of basic trigonometric functions (*involving changes in period, amplitude, phase and midline*) and understand the relationship between constants in the formula and the transformed graph.

PE/TE: 661-662, 663-665, 666, 667, 683, 685, 686-687, 708, 741, 789

STANDARD G1: FIGURES AND THEIR PROPERTIES

G1.7 *Conic Sections and Their Properties*

G1.7.1 Find an equation of a circle given its center and radius;
given the equation of a circle, find its center and radius.

PE/TE: 703-705, 706-708, 716, 734, 737, 738-739, 741, 790, 793

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.

PE/TE: 697-698, 700, 703, 706-707, 710-711, 713-714, 716, 717-718, 720-721, 723, 724-727,
728-731, 734-736, 737, 739, 741, 790

G1.7.3 Graph ellipses and hyperbolas with axes parallel to the x - and y -axes, given equations.

PE/TE: 710-711, 713-716, 717-719, 720-721, 725, 728-731, 732, 735-736, 737, 741, 790

STANDARD S1: UNIVARIATE DATA-EXAMINING DISTRIBUTIONS

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.

PE/TE: 47-48, 50-51, 52-53, 54-55, 56, 60, 61, 63, 78, 407, 535, 536-538, 778

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.

PE/TE: 48, 53, 55, 535, 536-537

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.

PE/TE: 46-48, 49-51, 56, 60, 61, 63, 85, 166, 348, 394, 395-397, 398-399, 404, 533-534, 536-538, 576, 778, 787

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.

PE/TE: *The opportunity to address this standard can be found on the following pages:*

52-53, 54-56

S1.2.3 Compute and interpret measures of variation, including percentiles, quartiles, interquartile range, variance and standard deviation.

PE/TE: 47-48, 49-51, 56, 60, 63, 144, 348, 395-397, 398-399, 400, 404, 405, 407, 524, 533-534, 536-538, 576, 778, 784, 787, 797

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.

PE/TE: *The opportunity to address this standard can be found on pages:*

519, 528

S1.3.2 Describe characteristics of the normal distribution, including its shape and the relationships among its mean, median and mode.

PE/TE: *This standard is outside the scope of **Algebra 2: Concepts and Skills**.*

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.

PE/TE: *This standard is outside the scope of **Algebra 2: Concepts and Skills**.*

S1.3.4 Calculate z -scores, use z -scores to recognize outliers and use z -scores to make informed decisions.

PE/TE: *This standard is outside the scope of **Algebra 2: Concepts and Skills**.*

STANDARD S3: SAMPLES, SURVEYS AND EXPERIMENTS

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.

PE/TE: 519, 522, 525, 526-528, 529-531

S3.1.2 Identify possible sources of bias in data collection, 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.

PE/TE: 519-521, 522-524, 525, 526-527, 529-530, 532, 568, 575-576, 580, 634

S3.1.3 Distinguish between an observational study and an experimental study and identify, in context, the conclusions that can be drawn from each.

PE/TE: *The opportunity to address this standard can be found on pages:*

519-521

STANDARD S4: PROBABILITY MODELS AND CALCULATIONS

S4.1 *Probability*

S4.1.1 Understand and construct sample spaces in simple situations.

PE/TE: 556, 564

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.

PE/TE: 562-564, 565-567, 569-571, 572-574, 578, 579, 580-581, 634, 666, 740, 787, 793

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.

PE/TE: 556-557, 560, 562-563, 567, 573

S4.2.2 Apply probability concepts to practical situations, in such settings as finance, health, ecology or epidemiology to make informed decisions.

PE/TE: 557-558, 560, 566, 572-573, 634, 787

