

TN DOE unique identifier	SPI	ACT content area	Range	<u>ACT College Readiness Standard</u>	NAEP content area	Grade	<u>NAEP 2009 Math Content Area Standard</u>
Algebra II							
Algebra II SPI 3103.1.1	Move flexibly between multiple representations (contextual, physical, written, verbal, iconic/pictorial, graphical, tabular, and symbolic) of non-linear and transcendental functions to solve problems, to model mathematical ideas, and to communicate solution strategies.	GR EEI	28-32 33-36 33-36	Match number line graphs with solution sets of linear inequalities Recognize special characteristics of parabolas and circles (e.g., the vertex of a parabola and the center or radius of a circle)† Identify characteristics of graphs based on a set of conditions or on a general equation such as $y = ax^2 + c$ Write expressions that require planning and/or manipulating to accurately model a situation Write equations and inequalities that require planning, manipulating, and/or solving	ALG	12	1e) Identify or analyze distinguishing properties of linear, quadratic, rational, exponential, or *trigonometric functions from tables, graphs, or equations. 1f) Recognize and analyze the general forms of linear, quadratic, rational, exponential, or *trigonometric functions. 2a) Create and translate between different representations of algebraic expressions, equations, and inequalities (e.g., linear, quadratic, exponential, or *trigonometric) using symbols, graphs, tables, diagrams, or written descriptions. 2f) Given a real-world situation, determine if a linear, quadratic, rational, exponential, logarithmic, or *trigonometric function fits the situation.
Algebra II SPI 3103.1.2	Recognize and describe errors in data collection and analysis as well as identifying representations of data as being accurate or misleading.	PSDA	24-27 28-32 33-36	Manipulate data from tables and graphs Interpret and use information from figures, tables, and graphs Analyze and draw conclusions based on information from figures, tables, and graphs	DASP	12	1d) Solve problems involving univariate or bivariate data. 3a) Identify possible sources of bias in sample surveys, and describe how such bias can be controlled and reduced. 3d) Identify or evaluate the characteristics of a good survey or of a well-designed experiment 5a) Identify misleading uses of data in real-world settings and critique different ways of presenting and using information. 5c) Recognize, use, and distinguish between the processes of mathematical (deterministic) and statistical modeling. 5d) Recognize when arguments based on data confuse correlation with causation.
Algebra II SPI 3103.1.3	Use technology tools to identify and	F	33-36	Match graphs of basic trigonometric	ALG	12	2b) Analyze or interpret relationships expressed in symbols, graphs, tables, diagrams

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	describe patterns in data using non-linear and transcendental functions that approximate data as well as using those functions to solve contextual problems.			functions with their equations†			(including Venn diagrams), or written descriptions and evaluate the relative advantages or disadvantages of different representations to answer specific questions. 2e) Make inferences or predictions using an algebraic model of a situation. 2f) Given a real-world situation, determine if a linear, quadratic, rational, exponential, logarithmic, or *trigonometric function fits the situation. 2g) Solve problems involving exponential growth and decay. 2h) Analyze properties of exponential, logarithmic, and rational functions. 4c) Analyze situations, develop mathematical models, or solve problems using linear, quadratic, exponential, or logarithmic equations or inequalities symbolically or graphically.
Algebra II SPI 3103.1.4	Use mathematical language, symbols, definitions, proofs and counterexamples correctly and precisely to effectively communicate reasoning in the process of solving problems via mathematical modeling with both linear and non-linear functions.	F GR	28-32 33-36 28-32 33-36	Evaluate composite functions at integer values† Write an expression for the composite of two simple functions† Write an expression for the composite of two simple functions† Match number line graphs with solution sets of simple quadratic inequalities	ALG	12	1e) Identify or analyze distinguishing properties of linear, quadratic, rational, exponential, or *trigonometric functions from tables, graphs, or equations. 5a) Use algebraic properties to develop a valid mathematical argument. 5b) Determine the role of hypotheses, logical implications, and conclusions in algebraic argument. 5c) Explain the use of relational conjunctions (and, or) in algebraic arguments.

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				Analyze and draw conclusions based on information from graphs in the coordinate plane	DASP	12	2e) Approximate a trend line if a linear pattern is apparent in a scatterplot or use a graphing calculator to determine a least-squares regression line, and use the line or equation to make predictions.
					NPO	12	6a) Give a mathematical argument to establish the validity of a simple numerical property or relationship. 6b) Analyze or interpret a proof by mathematical induction of a simple numerical relationship.
Algebra II SPI 3103.2.1	Describe any number in the complex number system.	NCP	24-27	Exhibit some knowledge of the complex numbers†	NPO	12	5f) Recognize properties of the number system—whole numbers, integers, rational numbers, real numbers, and complex numbers—recognize how they are related to each other, and identify examples of each type of number.
Algebra II SPI 3103.2.2	Compute with all real and complex numbers.	NCP	29-32 30-36	Multiply two complex numbers Apply properties of complex numbers	NPO	12	5e) Apply basic properties of operations, including conventions about the order of operation
Algebra II SPI 3103.2.3	Use the number system, from real to complex, to solve equations and contextual problems.	EEl	24-27	Solve real-world problems using first-degree equations Identify solutions to simple quadratic equations	ALG	12	2a) Create and translate between different representations of algebraic expressions, equations, and inequalities (e.g., linear, quadratic, exponential, or *trigonometric) using symbols, graphs, tables, diagrams, or written descriptions. 2g) Solve problems involving exponential growth and decay. 3b) Write algebraic expressions, equations, or inequalities to represent a situation. 4a) Solve linear, rational or quadratic equations or inequalities, including those involving absolute value. 4c) Analyze situations, develop mathematical models, or solve problems using linear,

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							quadratic, exponential, or logarithmic equations or inequalities symbolically or graphically. 4e) Solve problems involving special formulas such as: $A = P(I + r)^t$, $A = Pe^{rt}$. 4g) Solve quadratic equations with complex roots.
Algebra II SPI 3103.3.1	Add, subtract and multiply polynomials; divide a polynomial by a lower degree polynomial.	E EI	20-23 24-27	Multiply two binomials Add, subtract, and multiply polynomials	ALG	12	3c) Perform basic operations, using appropriate tools, on algebraic expressions including polynomial and rational expressions.
Algebra II SPI 3103.3.2	Solve quadratic equations and systems, and determine roots of a higher order polynomial.	E EI	28-32	Solve quadratic equations	ALG	12	4a) Solve linear, rational or quadratic equations or inequalities, including those involving absolute value. 4d) Solve (symbolically or graphically) a system of equations or inequalities and recognize the relationship between the analytical solution and graphical solution. 4g) Solve quadratic equations with complex roots.
		GR	33-36	Match number line graphs with solution sets of simple quadratic inequalities Solve problems integrating multiple algebraic and/or geometric concepts			
Algebra II SPI 3103.3.3	Add, subtract, multiply, divide and simplify rational expressions including those with rational and negative exponents.	N CO	24-27 28-32 33-36	Determine when an expression is undefined* Apply rules of exponents Draw conclusions based on number concepts, algebraic properties, and/or relationships between expressions and numbers	ALG	12	3c) Perform basic operations, using appropriate tools, on algebraic expressions including polynomial and rational expressions.
Algebra II SPI 3103.3.4	Use the formulas for the general term and summation of finite arithmetic and both finite and infinite geometric series.				ALG	12	1a) Recognize, describe, or extend numerical patterns, including arithmetic and geometric progressions. 3g) Determine the sum of finite and infinite arithmetic and geometric series.

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Algebra II SPI 3103.3.5	Describe the domain and range of functions and articulate restrictions imposed either by the operations or by the contextual situations which the functions represent.	NCP	24-27	Determine when an expression is undefined	ALG	12	1i) Determine the domain and range of functions given in various forms and contexts.
Algebra II SPI 3103.3.6	Combine functions (such as polynomial, rational, radical and absolute value expressions) by addition, subtraction, multiplication, division, or by composition and evaluate at specified values of their variables.	FN	20-23 24-27 28-32 33-36	Evaluate quadratic functions, expressed in function notation, at integer values Evaluate polynomial functions, expressed in function notation, at integer values Evaluate composite functions at integer values Write an expression for the composite of two simple functions	ALG	12	3f) Use function notation to evaluate a function at a specified point in its domain and combine functions by addition, subtraction, multiplication, division, and composition.
Algebra II SPI 3103.3.7	Identify whether a function has an inverse, whether two functions are inverses of each other, and/or explain why their graphs are reflections over the line $y = x$.				ALG	12	1j) Given a function, determine its inverse if it exists, and explain the contextual meaning of the inverse for a given situation.
Algebra II SPI 3103.3.8	Solve systems of three linear equations in three variables.	EEI	28-32	Find solutions to systems of linear equations	ALG	12	4d) Solve (symbolically or graphically) a system of equations or inequalities and recognize the relationship between the analytical solution and graphical solution.
Algebra II SPI 3103.3.9	Graph the solution set of two or three linear or quadratic inequalities.				ALG	12	4d) Solve (symbolically or graphically) a system of equations or inequalities and recognize the relationship between the analytical solution and graphical solution.
Algebra II SPI 3103.3.10	Identify and/or graph a variety of functions and their translations.				ALG	12	2d) Perform or interpret transformations on the graphs of linear, quadratic, exponential, and *trigonometric functions.

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Algebra II SPI 3103.3.13	Solve contextual problems using quadratic, rational, radical and exponential equations, finite geometric series or systems of equations.	EEI		Solve quadratic equations	ALG	12	<p>1b) Express linear and exponential functions in recursive and explicit form given a table, verbal description, or some terms of a sequence.</p> <p>2f) Given a real-world situation, determine if a linear, quadratic, rational, exponential, logarithmic, or *trigonometric function fits the situation.</p> <p>2g) Solve problems involving exponential growth and decay.</p> <p>4c) Analyze situations, develop mathematical models, or solve problems using linear, quadratic, exponential, or logarithmic equations or inequalities symbolically or graphically.</p> <p>4e) Solve problems involving special formulas such as: $A = P(I + r)^t$, $A = Pe^{rt}$.</p>
Algebra II SPI 3103.3.14	Solve problems involving the binomial theorem and its connection to Pascal's Triangle, combinatorics, and probability.	PSDA	28-32	Apply counting techniques	DASP	12	4k) Use the binomial theorem to solve problems
Algebra II SPI 3103.4.1	Exhibit knowledge of unit circle trigonometry.	FN	33-36	Exhibit knowledge of unit circle trigonometry	MEAS	12	3e) Determine the radian measure of an angle and explain how radian measurement is related to a circle of radius 1.
Algebra II SPI 3103.4.2	Match graphs of basic trigonometric functions with their equations.	FN	33-36	Match graphs of basic trigonometric functions with their equations	ALG	12	<p>1e) Identify or analyze distinguishing properties of linear, quadratic, rational, exponential, or *trigonometric functions from tables, graphs, or equations.</p> <p>1h) Recognize and analyze the general forms</p>

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							<p>of linear, quadratic, rational, exponential, or *trigonometric functions.</p> <p>2a) Create and translate between different representations of algebraic expressions, equations, and inequalities (e.g., linear, quadratic, exponential, or *trigonometric) using symbols, graphs, tables, diagrams, or written descriptions.</p> <p>2d) Perform or interpret transformations on the graphs of linear, quadratic, exponential, and *trigonometric functions.</p>
Algebra II SPI 3103.4.3	Describe and articulate the characteristics and parameters of parent trigonometric functions to solve contextual problems.	FN	33-36	Use trigonometric concepts and basic identities to solve problems	ALG	12	<p>1e)) Identify or analyze distinguishing properties of linear, quadratic, rational, exponential, or *trigonometric functions from tables, graphs, or equations.</p> <p>1h) Recognize and analyze the general forms of linear, quadratic, rational, exponential, or *trigonometric functions.</p>
Algebra II SPI 3103.5.1	Compute, compare and explain summary statistics for distributions of data including measures of center and spread.	PSDA	24-27	Calculate the average, given the frequency counts of all the data values	DASP	12	<p>2a) Calculate, interpret, or use summary statistics for distributions of data including measures of typical value (mean, median), position (quartiles, percentiles), and spread (range, interquartile range, variance, standard deviation).</p> <p>2b) Recognize how linear transformations of one-variable data affect mean, median, mode, range, interquartile range, and standard deviation.</p>

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			33-36	Distinguish between mean, median, and mode for a list of numbers			2c) Determine the effect of outliers on mean, median, mode, range, interquartile range, or standard deviation. 2d) Compare data sets using summary statistics (mean, median, mode, range, interquartile range, or standard deviation) describing the same characteristic for two different populations or subsets of the same population.
Algebra II SPI 3103.5.2	Compare data sets using graphs and summary statistics.	PSDA	33-36	Analyze and draw conclusions based on information from figures, tables, and graphs	DASP	12	2d) Compare data sets using summary statistics (mean, median, mode, range, interquartile range, or standard deviation) describing the same characteristic for two different populations or subsets of the same population.
Algebra II SPI 3103.5.3	Analyze patterns in a scatter-plot and describe relationships in both linear and non-linear data.				DASP	12	2e) Approximate a trend line if a linear pattern is apparent in a scatterplot or use a graphing calculator to determine a least-squares regression line, and use the line or equation to make predictions.
Algebra II SPI 3103.5.4	Apply the characteristics of the normal distribution.				DASP	12	2g) Know and interpret the key characteristics of a normal distribution such as shape, center (mean), and spread (standard deviation).
Algebra II SPI 3103.5.5	Determine differences between randomized experiments and observational studies.				DASP	12	3e) Recognize the differences in design and in conclusions between randomized experiments and observational studies.
Algebra II SPI 3103.5.6	Find the regression curve that best fits both linear and non-linear data (using technology such as a graphing calculator) and use it to make predictions.				DASP	12	2e) Approximate a trend line if a linear pattern is apparent in a scatterplot or use a graphing calculator to determine a least-squares regression line, and use the line or equation to make predictions. 5c) Recognize, use, and distinguish between the processes of mathematical (deterministic) and statistical modeling.

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Algebra II SPI 3103.5.7	Determine/recognize when the correlation coefficient measures goodness of fit.				DASP	12	<p>2f) Recognize that the correlation coefficient is a number from -1 to $+1$ that measures the strength of the linear relationship between two variables; visually estimate the correlation coefficient (e.g., positive or negative, closer to 0, .5, or 1.0) of a scatterplot.</p> <p>5d) Recognize when arguments based on data confuse correlation with causation.</p>
Algebra II SPI 3103.5.8	Apply probability concepts such as conditional probability and independent events to calculate simple probability.	PSDA	20-23 33-36	<p>Determine the probability of a simple event</p> <p>Exhibit knowledge of conditional and joint probability</p>	DASP	12	<p>4a) Recognize whether two events are independent or dependent.</p> <p>4b) Determine the theoretical probability of simple and compound events in familiar or unfamiliar contexts.</p> <p>4c) Given the results of an experiment or simulation, estimate the probability of simple or compound events in familiar or unfamiliar contexts.</p> <p>4h) Determine the probability of independent and dependent events.</p>