

Correlation of the ALEKS Course Algebra 1 to the California Algebra 1 Mathematics Content Standards

Algebra I: Symbolic reasoning and calculations with symbols are central in algebra. Through the study of algebra, a student develops an understanding of the symbolic language of mathematics and the sciences. In addition, algebraic skills and concepts are developed and used in a wide variety of problem-solving situations.

Operations & Linear Equations: Standards 1.0 - 5.0

ALEKS course topic that addresses the standard

1.0: Students identify and use the arithmetic properties of subsets of integers and rational, irrational, and real numbers, including closure properties for the four basic arithmetic operations where applicable: 1.1: Students use properties of numbers to demonstrate whether assertions are true or false.

- Properties of addition
- Properties of real numbers

2.0: Students understand and use such operations as taking the opposite, finding the reciprocal, taking a root, and raising to a fractional power. They understand and use the rules of exponents.

- The reciprocal of a number
- Additive property of equality with integers
- Additive property of equality with a negative coefficient
- Multiplicative property of equality with whole numbers
- Multiplicative property of equality with signed fractions
- Solving a linear inequality: Problem type 1
- Absolute value of a number
- Operations with absolute value
- Evaluating expressions with exponents: Problem type 1
- Evaluating expressions with exponents: Problem type 2
- Exponents and order of operations
- Product rule of exponents
- Quotients of expressions involving exponents
- Power rule with positive exponents
- Writing a positive number without a negative exponent
- Writing a negative number without a negative exponent
- Power rule with negative exponents: Problem type 1
- · Product rule of exponents in a multivariate monomial
- Ordering numbers with positive exponents

- Ordering numbers with negative exponents
- Square root of a perfect square
- Square root of a rational perfect square
- Square root simplification
- Square root of a perfect square monomial
- Simplifying a radical expression: Problem type 1
- Simplifying a radical expression: Problem type 2

3.0: Students solve equations and inequalities involving absolute values.

- Simple absolute value equation
- Solving an equation involving absolute value: Basic
- Solving an inequality involving absolute value: Basic
- · Solving an inequality involving absolute value

4.0: Students simplify expressions before solving linear equations and inequalities in one variable, such as 3(2x-5) + 4(x-2) = 12.

- Solving a linear equation with several occurrences of the variable: Problem type 1
- Solving a linear equation with several occurrences of the variable: Problem type 3
- Solving a linear equation with several occurrences of the variable: Problem type 4
- Solving a linear equation with several occurrences of the variable: Problem type 5

5.0: Students solve multistep problems, including word problems, involving linear equations and linear inequalities in one variable and provide justification for each step.

- Simple word problem on proportions
- Solving a two-step equation with integers
- Solving a two-step equation with signed fractions
- Solving an equation to find the value of an expression
- Solving a linear equation with several occurrences of the variable: Problem type 1
- · Solving a linear equation with several occurrences of the variable: Problem type 2
- Solving a linear equation with several occurrences of the variable: Problem type 3
- · Solving a linear equation with several occurrences of the variable: Problem type 4
- Solving a linear equation with several occurrences of the variable: Problem type 5
- Solving a linear inequality: Problem type 2
- Solving a linear inequality: Problem type 3
- Solving a linear inequality: Problem type 4
- Solving a word problem using a linear equation: Problem type 1
- Solving a word problem using a linear equation: Problem type 2
- Solving a word problem using a linear equation: Problem type 3
- Solving a word problem using a linear equation: Problem type 4
- Word problem with linear inequalities

Graphing & Systems of Equations: Standards 6.0 - 9.0

• = ALEKS course topic that addresses the standard

6.0: Students graph a linear equation and compute the x- and y-intercepts (e.g., graph 2x + 6y = 4). They are also able to sketch the region defined by linear inequality (e.g., they sketch the region defined by 2x + 6y < 4).

• Graphing a line given the x- and y-intercepts

- Graphing a line given its equation in slope-intercept form
- Graphing a line given its equation in standard form
- Graphing a line through a given point with a given slope
- Graphing a vertical or horizontal line
- Graphing a linear inequality in the plane: Problem type 1
- Graphing a linear inequality in the plane: Problem type 2
- Graphing a linear inequality in the plane: Problem type 3
- Y-intercept of a line
- · Finding x- and y-intercepts of a line given the equation in standard form

7.0: Students verify that a point lies on a line, given an equation of the line. Students are able to derive linear equations by using the point-slope formula.

- · Writing equations and drawing graphs to fit a narrative
- · Solutions to a linear equation in two variables: Problem type 1
- Solutions to a linear equation in two variables: Problem type 2
- Finding slope given the graph of a line on a grid
- · Finding slope given two points on the line
- Finding the slope of a line given its equation
- Writing an equation of a line given the y-intercept and a point
- · Writing the equation of a line given the slope and a point on the line
- · Writing the equation of the line through two given points

8.0: Students understand the concepts of parallel lines and perpendicular lines and how those slopes are related. Students are able to find the equation of a line perpendicular to a given line that passes through a given point.

- Slopes of parallel and perpendicular lines: Problem type 1
- Slopes of parallel and perpendicular lines: Problem type 2

9.0: Students solve a system of two linear equations in two variables algebraically and are able to interpret the answer graphically. Students are able to solve a system of two linear inequalities in two variables and to sketch the solution sets.

- Solving a system of linear equations
- · Graphically solving a system of linear equations
- Classifying systems of linear equations from graphs
- Solving a word problem using a system of linear equations: Problem type 1
- Solving a word problem using a system of linear equations: Problem type 2
- Solving a word problem using a system of linear equations: Problem type 3
- Solving a word problem using a system of linear equations: Problem type 4
- Solving a word problem using a system of linear equations: Problem type 5
- · Graphing a system of linear inequalities

Polynomials & Rational Expressions: Standards 10.0 - 15.0

ALEKS course topic that addresses the standard

10.0: Students add, subtract, multiply, and divide monomials and polynomials. Students solve multistep problems, including word problems, by using these techniques.

- Combining like terms: Basic
- Combining like terms: Advanced
- Simplifying a polynomial expression
- Multiplying monomials
- Multiplying binomials: Problem type 1
- Squaring a binomial
- Multiplying polynomials
- Polynomial long division: Problem type 1
- Solving a proportion: Advanced

11.0: Students apply basic factoring techniques to second- and simple third-degree polynomials. These techniques include finding a common factor for all terms in a polynomial, recognizing the difference of two squares, and recognizing perfect squares of binomials.

- · Factoring a quadratic with leading coefficient 1
- · Factoring a quadratic with leading coefficient greater than 1
- Factoring a perfect square
- · Factoring a quadratic polynomial in two variables
- Factoring a product of a quadratic trinomial and a monomial
- Factoring a difference of squares
- · Factoring with repeated use of the difference of squares formula
- Greatest common factor of two monomials
- · Factoring a multivariate polynomial by grouping: Problem type 1
- Factoring a multivariate polynomial by grouping: Problem type 2

12.0: Students simplify fractions with polynomials in the numerator and denominator by factoring both and reducing them to the lowest terms.

- Simplifying a ratio of polynomials: Problem type 1
- Simplifying a ratio of polynomials: Problem type 2
- · Ratio of multivariate polynomials

13.0: Students add, subtract, multiply, and divide rational expressions and functions. Students solve both computationally and conceptually challenging problems by using these techniques.

- Multiplying rational expressions: Problem type 1
- Multiplying rational expressions: Problem type 2
- Dividing rational expressions: Problem type 1
- Complex fraction: Problem type 1
- · Adding rational expressions with common denominators
- Adding rational expressions
- · Adding rational expressions with different denominators
- Adding and subtracting rational expressions: Problem type 1
- Adding and subtracting rational expressions: Problem type 2
- · Solving a rational equation that simplifies to a linear equation: Problem type 1
- Solving a rational equation that simplifies to a linear equation: Problem type 2
- Solving a rational equation that simplifies to a linear equation: Problem type 3
- Solving a rational equation that simplifies to a quadratic equation: Problem type 1
- Solving a rational equation that simplifies to a quadratic equation: Problem type 2
- Solving a rational equation that simplifies to a quadratic equation: Problem type 3

14.0: Students solve a quadratic equation by factoring or completing the square.

- Solving equations written in factored form
- Finding the roots of a quadratic equation with leading coefficient 1
- Finding the roots of a quadratic equation with leading coefficient greater than 1
- Solving a quadratic equation needing simplification
- Completing the square

15.0: Students apply algebraic techniques to solve rate problems, work problems, and percent mixture problems.

- Application problem with a linear function: Problem type 1
- Application problem with a linear function: Problem type 2
- Solving a word problem using a system of linear equations: Problem type 2
- Solving a word problem using a system of linear equations: Problem type 3
- Solving a word problem using a system of linear equations: Problem type 4
- Word problem on rates
- Word problem on proportions: Problem type 1
- Word problem on proportions: Problem type 2
- Word problem involving multiple rates
- Word problem on inverse proportions
- Word problem on direct variation
- Word problem on inverse variation
- Converting between compound units: Basic
- Converting between compound units: Advanced

Functions, Quadratic Equations & Reasoning: Standards 16.0 - 25.0

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16.0: Students understand the concepts of a relation and a function, determine whether a given relation defines a function, and give pertinent information about given relations and functions.

- Function tables with two-step rules
- Function tables
- Graphing integer functions
- Vertical line test

17.0: Students determine the domain of independent variables and the range of dependent variables defined by a graph, a set of ordered pairs, or a symbolic expression.

- Domain and range from ordered pairs
- Domain of a square root function
- Restriction on variable in a denominator

18.0: Students determine whether a relation defined by a graph, a set of ordered pairs, or a symbolic expression is a function and justify the conclusion.

• Vertical line test

19.0: Students know the quadratic formula and are familiar with its proof by completing the square.

• Solving a quadratic equation using the quadratic formula

20.0: Students use the quadratic formula to find the roots of a second-degree polynomial and to solve quadratic equations.

• Solving a quadratic equation using the quadratic formula

21.0: Students graph quadratic functions and know that their roots are the x-intercepts.

- Finding the x-intercept(s) and the vertex of a parabola
- Graphing a parabola: Problem type 1
- Graphing a parabola: Problem type 2
- Graphing a parabola: Problem type 3

22.0: Students use the quadratic formula or factoring techniques or both to determine whether the graph of a quadratic function will intersect the x-axis in zero, one, or two points.

- Discriminant of a quadratic equation
- Finding the x-intercept(s) and the vertex of a parabola

23.0: Students apply quadratic equations to physical problems, such as the motion of an object under the force of gravity.

- Solving a word problem using a quadratic equation with rational roots
- Solving a word problem using a quadratic equation with irrational roots

24.0: Students use and know simple aspects of a logical argument: 24.1 Students explain the difference between inductive and deductive reasoning and identify and provide examples of each. 24.2: Students identify the hypothesis and conclusion in logical deduction. 24.3: Students use counterexamples to show that an assertion is false and recognize that a single counterexample is sufficient to refute an assertion.

N/A

25.0: Students use properties of the number system to judge the validity of results, to justify each step of a procedure, and to prove or disprove statements: 25.1: Students use properties of numbers to construct simple, valid arguments (direct and indirect) for, or formulate counterexamples to, claimed assertions. 25.2: Students judge the validity of an argument according to whether the properties of the real number system and the order of operations have been applied correctly at each step. 25.3: Given a specific algebraic statement involving linear, quadratic, or absolute value expressions or equations or inequalities, students determine whether the statement is true sometimes, always, or never.

N/A