

Algebra I

| State Standard Number | State Standard Area/Description | Unit Name | Course Topic Description |
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| MA.912.A | Algebra | | |
| MA.912.A.1 | Expand and deepen understanding of real and complex numbers by comparing expressions and performing arithmetic computations, especially those involving square roots and exponents. Use the properties of real numbers to simplify algebraic expressions and equations, and they convert between different measurement units using dimensional analysis. | See detailed standards below. | |
| MA.912.A.1.1 | Know equivalent forms of real numbers (including integer exponents and radicals, percents, scientific notation, absolute value, rational numbers, irrational numbers). | Variables and Expressions Real Numbers Equations Polynomials | Sections 1 and 4 Sections 1 and 2 Section 3 Section 1 |
| MA.912.A.1.2 | Compare real number expressions. | Variables and Expressions Real Numbers | Section 3 Part 1 Section 1 Part 3 |
| MA.912.A.1.3 | Simplify real number expressions using the laws of exponents. | Variables and Expressions | Section 4 |
| MA.912.A.1.4 | Perform operations on real numbers (including integer exponents, radicals, percents, scientific notation, absolute value, rational numbers, and irrational numbers) using multi-step and real-world problems. | Variables and Expressions Real Numbers Equations | Section 1 Part 2 Section 3 Parts 2-5 Section 4 Parts 1 & 2 Sections 2 & 3 Section 3 Section 4 Part 2 |
| MA.912.A.1.5 | Use dimensional (unit) analysis to perform conversions between units of measure, including rates. | Real Numbers | Section 5 Part 3 |
| MA.912.A.1.6 | Identify the real and imaginary parts of complex numbers and perform basic operations. | | |
| MA.912.A.1.7 | Represent complex numbers geometrically. | | |

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| MA.912.A.1.8 | Use the zero product property of real numbers in a variety of contexts to identify solutions to equations. | | |
| MA.912.A.2 | Draw and interpret graphs of relations. Understand the notation and concept of a function, find domains and ranges, and link equations to functions. | See detailed standards below. | |
| MA.912.A.2.1 | Create a graph to represent a real-world situation. | Functions and Linear Equations | Section 2 Part 2 |
| MA.912.A.2.2 | Interpret a graph representing a real-world situation. | Functions and Linear Equations | Section 2 Part 2 |
| MA.912.A.2.3 | Describe the concept of a function, use function notation, determine whether a given relation is a function, and link equations to functions. | Functions and Linear Equations | Section 4 Part 1 |
| MA.912.A.2.4 | Determine the domain and range of a relation. | Functions and Linear Equations | Section 1 Part 2 |
| MA.912.A.2.5 | Graph absolute value equations and inequalities in two variables. | Functions and Linear Equations Inequalities | Section 3 Section 4 |
| MA.912.A.2.6 | Identify and graph common functions (including but not limited to linear, rational, quadratic, cubic, radical, absolute value). | Functions and Linear Equations Quadratics and Radicals Exponentials | Section 2 Parts 2-5 Section 1 Section 2 All Parts |
| MA.912.A.2.7 | Perform operations (addition, subtraction, division and multiplication) of functions algebraically, numerically, and graphically. | | |
| MA.912.A.2.8 | Determine the composition of functions. | | |
| MA.912.A.2.9 | Recognize, interpret, and graph functions defined piece-wise, with and without technology. | | |

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| MA.912.A.2.10 | Describe and graph transformations of functions. | | |
| MA.912.A.2.11 | Solve problems involving functions and their inverses. | Functions and Linear Equations | Section 1 Parts 2,3 |
| MA.912.A.2.12 | Solve problems using direct, inverse, and joint variations. | <i>Direct:</i> Functions and Linear Equations <i>Inverse:</i> Rational Numbers | <i>Direct:</i> Section 4, Part 3 <i>Inverse:</i> Section 1 |
| MA.912.A.2.13 | Solve real-world problems involving relations and functions. | Functions and Linear Equations | Dispersed throughout |
| MA.912.A.3 | Solve linear equations and inequalities. | See detailed standards below. | |
| MA.912.A.3.1 | Solve linear equations in one variable that include simplifying algebraic expressions. | Equations | Section 1 & 2 |
| MA.912.A.3.2 | Identify and apply the distributive, associative, and commutative properties of real numbers and the properties of equality. | Variables and Expressions Real Numbers Equations | Section 2 Section 5 Section 1 Part 3 |
| MA.912.A.3.3 | Solve literal equations for a specified variable. | Equations | Section 4 Part 1 |
| MA.912.A.3.4 | Solve and graph simple and compound inequalities in one variable and be able to justify each step in a solution. | Inequalities | Sections 1 & 2 |
| MA.912.A.3.5 | Symbolically represent and solve multi-step and real-world applications that involve linear equations and inequalities. | Equations Inequalities | Dispersed throughout Dispersed throughout |
| MA.912.A.3.6 | Solve and graph the solutions of absolute value equations and inequalities with one variable. | Equations Inequalities | Section 4 Part 2 Section 3 |
| MA.912.A.3.7 | Rewrite equations of a line into slope-intercept form and standard form. | Functions and Linear Equations | Section 2 Part 3 |
| MA.912.A.3.8 | Graph a line given any of the following information: a table of values, the x- and y-intercepts, two points, the slope and a point, the equation of the line in slope-intercept form, standard form, or point-slope form. | Functions and Linear Equations | Section 2 Parts 3,4,5 Section 4 Parts 5 & 6 |

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| MA.912.A.3.9 | Determine the slope, x-intercept, and y-intercept of a line given its graph, its equation, or two points on the line. | Functions and Linear Equations | Section 2 Part 5 Section 3 Part 3 |
| MA.912.A.3.10 | Write an equation of a line given any of the following information: two points on the line, its slope and one point on the line, or its graph. Also, find an equation of a new line parallel to a given line, or perpendicular to a given line, through a given point on the new line. | Functions and Linear Equations | Section 3 Part 3 Section 4 Parts 4,6,7,8 |
| MA.912.A.3.11 | Write an equation of a line that models a data set and use the equation or the graph to make predictions. Describe the slope of the line in terms of the data, recognizing that the slope is the rate of change. | Functions and Linear Equations | Section 2 Part 4 Section 4 Parts 2 & 4 Section 5 |
| MA.912.A.3.12 | Graph a linear equation or inequality in two variables with and without graphing technology. Write an equation or inequality represented by a given graph. | Functions and Linear Equations Inequalities | Section 2 Parts 2-5 Section 4 |
| MA.912.A.3.13 | Use a graph to approximate the solution of a system of linear equations or inequalities in two variables with and without technology. | Solving Systems | Section 1 Part 3 Section 3 Part 2 |
| MA.912.A.3.14 | Solve systems of linear equations and inequalities in two and three variables using graphical, substitution, and elimination methods. | Solving Systems (No three variable systems) | Section 1 Part 2 Section 2 Section 3 Part 2 |
| MA.912.A.3.15 | Solve real-world problems involving systems of linear equations and inequalities in two and three variables. | Solving Systems | Section 1 Part 4 Section 2 Part 4 Section 3 Part 3 |
| MA.912.A.4 | Perform operations on polynomials. Find factors of polynomials, learning special techniques for factoring quadratics. Understand the relationships among the solutions of polynomial equations, the zeros of a polynomial function, | See detailed standards below. | |

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| | the x-intercepts of a graph, and the factors of a polynomial. | | |
| MA.912.A.4.1 | Simplify monomials and monomial expressions using the laws of integral exponents. | Numbers and Expressions Polynomials | Section 4 Parts 4 & 6 Section 3 Part 1 |
| MA.912.A.4.2 | Add, subtract, and multiply polynomials. | Polynomials | Section 2 Part 2 Section 3 |
| MA.912.A.4.3 | Factor polynomial expressions. | Polynomials | Sections 4,5,6 |
| MA.912.A.4.4 | Divide polynomials by monomials and polynomials with various techniques, including synthetic division. | Rational Expressions (no synthetic division) | Section 2 Parts 4 & 5 |
| MA.912.A.4.5 | Graph polynomial functions with and without technology and describe end behavior. | Quadratics and Radicals | Section 1 |
| MA.912.A.4.6 | Use theorems of polynomial behavior (including but not limited to the Fundamental Theorem of Algebra, Remainder Theorem, the Rational Root Theorem, Descartes' Rule of Signs, and the Conjugate Root Theorem) to find the zeros of a polynomial function. | | |
| MA.912.A.4.7 | Write a polynomial equation for a given set of real and/or complex roots. | | |
| MA.912.A.4.8 | Describe the relationships among the solutions of an equation, the zeros of a function, the x-intercepts of a graph, and the factors of a polynomial expression, with and without technology. | Quadratics and Radicals | Section 1 Parts 2-4 |
| MA.912.A.4.9 | Use graphing technology to find approximate solutions for polynomial equations. | Quadratics and Radicals | Section 1 |
| MA.912.A.4.10 | Use polynomial equations to solve real-world problems. | Quadratics and Radicals | Dispersed throughout |

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| MA.912.A.4.11 | Solve a polynomial inequality by examining the graph with and without the use of technology. | | |
| MA.912.A.4.12 | Apply the Binomial Theorem. | | |
| MA.912.A.5 | Simplify rational expressions and solve rational equations using what they have learned about factoring polynomials. | See detailed standards below | |
| MA.912.A.5.1 | Simplify algebraic ratios. | Rational Expressions | Section 2 |
| MA.912.A.5.2 | Add, subtract, multiply, and divide rational expressions. | Rational Expressions | Section 2 Parts 2 & 3 Section 3 |
| MA.912.A.5.3 | Simplify complex fractions. | | |
| MA.912.A.5.4 | Solve algebraic proportions. | Rational Expressions | Section 4 Part 2 |
| MA.912.A.5.5 | Solve rational equations. | Rational Expressions | Section 4 Part 1 |
| MA.912.A.5.6 | Identify removable and non-removable discontinuities and vertical, horizontal, and oblique asymptotes of a graph of a rational function, find the zeros, and graph the function. | | |
| MA.912.A.5.7 | Solve real-world problems involving rational equations (mixture, distance, work, interest, and ratio). | Equations | Section 5 |
| MA.912.A.6 | Simplify and perform operations on radical expressions and equations. Rationalize square root expressions and understand and use the concepts of negative and rational exponents. Add, subtract, multiply, divide, and simplify radical expressions and expressions with rational exponents. Solve radical equations and equations with terms that have rational exponents. | See detailed standards below. | |
| MA.912.A.6.1 | Simplify radical expressions. | Quadratics and Radicals | Section 3 |
| MA.912.A.6.2 | Add, subtract, multiply and divide radical expressions (square roots and higher). | Quadratics and Radicals | Section 4 |
| MA.912.A.6.3 | Simplify expressions using properties of rational exponents. | Numbers and Expressions | Section 4 Part 3 |

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| MA.912.A.6.4 | Convert between rational exponent and radical forms of expressions. | Numbers and Expressions | Section 4 |
| MA.912.A.6.5 | Solve equations that contain radical expressions. | Quadratics and Radicals | Section 5 |
| MA.912.A.7 | Draw graphs of quadratic functions. Solve quadratic equations and solve these equations by factoring, completing the square and by using the quadratic formula. Use graphing calculators to find approximate solutions of quadratic equations. | See detailed standards below | |
| MA.912.A.7.1 | Graph quadratic equations with and without graphing technology. | Quadratics and Radicals | Section 1 |
| MA.912.A.7.2 | Solve quadratic equations over the real numbers by factoring, and by using the quadratic formula. | Polynomials Quadratics and Radicals | Section 4 Part 4 Section 5 Part 2 Section 2 Part 3 |
| MA.912.A.7.3 | Solve quadratic equations over the real numbers by completing the square. | Quadratics and Radicals | Section 2 Part 2 |
| MA.912.A.7.4 | Use the discriminant to determine the nature of the roots of a quadratic equation. | | |
| MA.912.A.7.5 | Solve quadratic equations over the complex number system. | | |
| MA.912.A.7.6 | Identify the axis of symmetry, vertex, domain, range and intercept(s) for a given parabola. | Quadratics and Radicals | Section 1 Part 2 |
| MA.912.A.7.7 | Solve non-linear systems of equations with and without using technology. | Quadratics and Radicals | Entire Unite |
| MA.912.A.7.8 | Use quadratic equations to solve real-world problems. | Quadratics and Radicals | Dispersed throughout |
| MA.912.A.7.9 | Solve optimization problems. | Quadratics and Radicals | Dispersed throughout |
| MA.912.A.7.10 | Use graphing technology to find approximate solutions of quadratic equations. | Quadratics and Radicals | Section 1 |
| MA.912.A.8 | Understand the concepts of logarithmic and exponential functions. Graph exponential | See detailed standards below. | |

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| | functions and solve problems of growth and decay. Understand the inverse relationship between exponents and logarithms and use it to prove laws of logarithms and to solve equations. Convert logarithms between bases and simplify logarithmic expressions. | | |
| MA.912.A.8.1 | Define exponential and logarithmic functions and determine their relationship. | Exponentials (No logarithms) | Sections 1 & 2 |
| MA.912.A.8.2 | Define and use the properties of logarithms to simplify logarithmic expressions and to find their approximate values. | | |
| MA.912.A.8.3 | Graph exponential and logarithmic functions. | Exponentials (No logarithms) | Sections 1 & 2 |
| MA.912.A.8.4 | Prove laws of logarithms. | | |
| MA.912.A.8.5 | Solve logarithmic and exponential equations. | | |
| MA.912.A.8.6 | Use the change of base formula. | | |
| MA.912.A.8.7 | Solve applications of exponential growth and decay. | Exponentials | Sections 1 & 2 |
| MA.912.A.9 | Write equations and draw graphs of conic sections (circle, ellipse, parabola, and hyperbola), thus relating an algebraic representation to a geometric one. | | |
| MA.912.A.9.1 | Write the equations of conic sections in standard form and general form, in order to identify the conic section and to find its geometric properties (foci, asymptotes, eccentricity, etc.). | | |
| MA.912.A.9.2 | Graph conic sections with and without using graphing technology. | | |
| MA.912.A.9.3 | Solve real-world problems involving conic sections. | | |

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| MA.912.A.10 | In a general sense, all of mathematics is problem solving. In all of mathematics, use problem-solving skills, choose how to approach a problem, explain the reasoning, and check the results | See detailed standards below | |
| MA.912.A.10.1 | Use a variety of problem-solving strategies, such as drawing a diagram, making a chart, guessing-and-checking, solving a simpler problem, writing an equation, working backwards, and creating a table. | Real Numbers | Section 4 Part 3 |
| MA.912.A.10.2 | Decide whether a solution is reasonable in the context of the original situation. | Real Numbers | Section 4 Part 3 |
| MA.912.A.10.3 | Decide whether a given statement is always, sometimes, or never true (statements involving linear or quadratic expressions, equations, or inequalities rational or radical expressions or logarithmic or exponential functions). | Equations | Section 1 Part 6 |
| MA.912.A.10.4 | Use counterexamples to show that statements are false. | Equations | Section 1 Part 6 |