# Indiana Academic Standards for Mathematics – Algebra 1
## Adopted April 2014 – Standards Correlation Guide Document 10/02/2017

| | Indiana Academic Standards for Mathematics – Algebra 1 Adopted April 2014 Standards Correlation Guide Document | Indiana Academic Mathematics Standard Adopted 2000 | Common Core State Standard for Mathematics | Differences From Previous Standards |
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| | | **Process Standards** | | |
| MA.A1.PS.1: Make sense of problems and persevere in solving them. | Mathematically proficient students start by explaining to themselves the meaning of a problem and looking for entry points to its solution. They analyze givens, constraints, relationships, and goals. They make conjectures about the form and meaning of the solution and plan a solution pathway, rather than simply jumping into a solution attempt. They consider analogous problems and try special cases and simpler forms of the original problem in order to gain insight into its solution. They monitor and evaluate their progress and change course if necessary. Mathematically proficient students check their answers to problems using a different method, and they continually ask themselves, "Does this make sense?" and "Is my answer reasonable?" They understand the approaches of others to solving complex problems and identify correspondences between different approaches. Mathematically proficient students understand how mathematical ideas interconnect and build on one another to produce a coherent whole. | Connections Connecting mathematical concepts includes linking new ideas to related ideas learned previously, helping students to see mathematics as a unified body of knowledge whose concepts build upon each other. Major emphasis should be given to ideas and concepts across mathematical content areas that help students see that mathematics is a web of closely connected ideas (algebra, geometry, the entire number system). Mathematics is also the common language of many other disciplines (science, technology, finance, social science, geography) and students should learn mathematical concepts used in those disciplines. Finally, students should connect their mathematical learning to appropriate real-world contexts. A1.9.1 Use a variety of problem-solving strategies, such as drawing a diagram, making a chart, guess-and-check, solving a simpler problem, writing an equation, and working backwards. A1.9.2 Decide whether a solution is reasonable in the context of the original situation. | 1 Make sense of problems and persevere in solving them. Mathematically proficient students start by explaining to themselves the meaning of a problem and looking for entry points to its solution. They analyze givens, constraints, relationships, and goals. They make conjectures about the form and meaning of the solution and plan a solution pathway rather than simply jumping into a solution attempt. They consider analogous problems, and try special cases and simpler forms of the original problem in order to gain insight into its solution. They monitor and evaluate their progress and change course if necessary. Older students might, depending on the context of the problem, transform algebraic expressions or change the viewing window on their graphing calculator to get the information they need. Mathematically proficient students can explain correspondences between equations, verbal descriptions, tables, and graphs or draw diagrams of important features and relationships, graph data, and search for regularity or trends. Younger students might rely on using concrete objects or pictures to help conceptualize and solve a problem. Mathematically proficient students check their answers to problems using a different method, and they continually ask themselves, "Does this make sense?" They can understand the approaches of others to solving complex problems and identify correspondences between different approaches. | IAS 2014 removes criteria involving a graphing calculator and does not distinguish between younger and older students. |
| MA.A1.PS.2: Reason abstractly and quantitatively. | Mathematically proficient students make sense of quantities and their relationships in problem situations. They bring two complementary abilities to bear on problems involving quantitative relationships: the ability to decontextualize—to abstract a given situation and represent it symbolically and manipulate the representing symbols as if they have a life of their own, without necessarily attending to their referents—and the ability to contextualize, to pause as needed during the manipulation process in order to probe into the referents for the symbols involved. Quantitative reasoning entails habits of creating a coherent representation of the problem at hand; considering the units involved; attending to the meaning of quantities, not just how to compute them; and knowing and flexibly using different properties of operations and objects. | A1.9.3 Use the properties of the real number system and the order of operations to justify the steps of simplifying functions and solving equations. A1.9.4 Understand that the logic of equation solving begins with the assumption that the variable is a number that satisfies the equation and that the steps taken when solving equations create new equations that have, in most cases, the same solution set as the original. Understand that similar logic applies to solving systems of equations simultaneously. | 2 Reason abstractly and quantitatively. Mathematically proficient students make sense of the quantities and their relationships in problem situations. Students bring two complementary abilities to bear on problems involving quantitative relationships: the ability to decontextualize—to abstract a given situation and represent it symbolically and manipulate the representing symbols as if they have a life of their own, without necessarily attending to their referents—and the ability to contextualize, to pause as needed during the manipulation process in order to probe into the referents for the symbols involved. Quantitative reasoning entails habits of creating a coherent representation of the problem at hand; considering the units involved; attending to the meaning of quantities, not just how to compute them; and knowing and flexibly using different properties of operations and objects. A-REI.1 Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method. | IAS 2014 is similar to common core, both expand upon IAS 2000 by having the student decontextualize problems and develop quantitative reasoning. |

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| MA.A1.PS.3: Construct viable arguments and critique the reasoning of others. | Mathematically proficient students understand and use stated assumptions, definitions, and previously established results in constructing arguments. They make conjectures and build a logical progression of statements to explore the truth of their conjectures. They analyze situations by breaking them into cases and recognize and use counterexamples. They organize their mathematical thinking, justify their conclusions and communicate them to others, and respond to the arguments of others. They reason inductively about data, making plausible arguments that take into account the context from which the data arose. Mathematically proficient students are also able to compare the effectiveness of two plausible arguments, distinguish correct logic or reasoning from that which is flawed, and—if there is a flaw in an argument—explain what it is. They justify whether a given statement is true always, sometimes, or never. Mathematically proficient students participate and collaborate in a mathematics community. They listen to or read the arguments of others, decide whether they make sense, and ask useful questions to clarify or improve the arguments. | Communication The ability to read, write, listen, ask questions, think, and communicate about math will develop and deepen students' understanding of mathematical concepts. Students should read text, data, tables, and graphs with comprehension and understanding. Their writing should be detailed and coherent, and they should use correct mathematical vocabulary. Students should write to explain answers, justify mathematical reasoning, and describe problem-solving strategies.<br><br>A1.9.5 Decide whether a given algebraic statement is true always, sometimes, or never (statements involving linear or quadratic expressions, equations, or inequalities).<br><br>A1.9.6 Distinguish between inductive and deductive reasoning, identifying and providing examples of each.<br><br>A1.9.8 Use counterexamples to show that statements are false, recognizing that a single counterexample is sufficient to prove a general statement false. | 3 Construct viable arguments and critique the reasoning of others. Mathematically proficient students understand and use stated assumptions, definitions, and previously established results in constructing arguments. They make conjectures and build a logical progression of statements to explore the truth of their conjectures. They are able to analyze situations by breaking them into cases, and can recognize and use counterexamples. They justify their conclusions, communicate them to others, and respond to the arguments of others. They reason inductively about data, making plausible arguments that take into account the context from which the data arose. Mathematically proficient students are also able to compare the effectiveness of two plausible arguments, distinguish correct logic or reasoning from that which is flawed, and—if there is a flaw in an argument—explain what it is. Elementary students can construct arguments using concrete referents such as objects, drawings, diagrams, and actions. Such arguments can make sense and be correct, even though they are not generalized or made formal until later grades. Later, students learn to determine domains to which an argument applies. Students at all grades can listen or read the arguments of others, decide whether they make sense, and ask useful questions to clarify or improve the arguments. | IAS 2014 is similar to common core, both expand upon IAS 2000 by having students construct arguments , use counterexamples, and critique others arguments. IAS 2014 does not distinguish between younger and older students. |
| MA.A1.PS.4: Model with mathematics. | Mathematically proficient students apply the mathematics they know to solve problems arising in everyday life, society, and the workplace using a variety of appropriate strategies. They create and use a variety of representations to solve problems and to organize and communicate mathematical ideas. Mathematically proficient students apply what they know and are comfortable making assumptions and approximations to simplify a complicated situation, realizing that these may need revision later. They are able to identify important quantities in a practical situation and map their relationships using such tools as diagrams, two-way tables, graphs, flowcharts and formulas. They analyze those relationships mathematically to draw conclusions. They routinely interpret their mathematical results in the context of the situation and reflect on whether the results make sense, possibly improving the model if it has not served its purpose. | Representation The language of mathematics is expressed in words, symbols, formulas, equations, graphs, and data displays. The concept of one-fourth may be described as a quarter, , one divided by four, 0.25, + , 25 percent, or an appropriately shaded portion of a pie graph. Higher-level mathematics involves the use of more powerful representations: exponents, logarithms, π, unknowns, statistical representation, algebraic and geometric expressions. Mathematical operations are expressed as representations: +, =, divide, square. Representations are dynamic tools for solving problems and communicating and expressing mathematical ideas and concepts. | 4 Model with mathematics. Mathematically proficient students can apply the mathematics they know to solve problems arising in everyday life, society, and the workplace. In early grades, this might be as simple as writing an addition equation to describe a situation. In middle grades, a student might apply proportional reasoning to plan a school event or analyze a problem in the community. By high school, a student might use geometry to solve a design problem or use a function to describe how one quantity of interest depends on another. Mathematically proficient students who can apply what they know are comfortable making assumptions and approximations to simplify a complicated situation, realizing that these may need revision later. They are able to identify important quantities in a practical situation and map their relationships using such tools as diagrams, two-way tables, graphs, flowcharts and formulas. They can analyze those relationships mathematically to draw conclusions. They routinely interpret their mathematical results in the context of the situation and reflect on whether the results make sense, possibly improving the model if it has not served its purpose. | IAS 2014 has removed examples and does not distinguish between younger and older students. |

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| MA.A1.PS.5: Use appropriate tools strategically. | Mathematically proficient students consider the available tools when solving a mathematical problem. These tools might include pencil and paper, models, a ruler, a protractor, a calculator, a spreadsheet, a computer algebra system, a statistical package, or dynamic geometry software. Mathematically proficient students are sufficiently familiar with tools appropriate for their grade or course to make sound decisions about when each of these tools might be helpful, recognizing both the insight to be gained and their limitations. Mathematically proficient students identify relevant external mathematical resources, such as digital content, and use them to pose or solve problems. They use technological tools to explore and deepen their understanding of concepts and to support the development of learning mathematics. They use technology to contribute to concept development, simulation, representation, reasoning, communication and problem solving. | A1.9.1 Use a variety of problem-solving strategies, such as drawing a diagram, making a chart, guess-and-check, solving a simpler problem, writing an equation, and working backwards. | 5 Use appropriate tools strategically. Mathematically proficient students consider the available tools when solving a mathematical problem. These tools might include pencil and paper, concrete models, a ruler, a protractor, a calculator, a spreadsheet, a computer algebra system, a statistical package, or dynamic geometry software. Proficient students are sufficiently familiar with tools appropriate for their grade or course to make sound decisions about when each of these tools might be helpful, recognizing both the insight to be gained and their limitations. For example, mathematically proficient high school students analyze graphs of functions and solutions generated using a graphing calculator. They detect possible errors by strategically using estimation and other mathematical knowledge. When making mathematical models, they know that technology can enable them to visualize the results of varying assumptions, explore consequences, and compare predictions with data. Mathematically proficient students at various grade levels are able to identify relevant external mathematical resources, such as digital content located on a website, and use them to pose or solve problems. They are able to use technological tools to explore and deepen their understanding of concepts. | IAS 2014 does not distinguish between younger and older students. Both IAS 2014 and CCSS expand upon IAS 2000 by having students consider more than just graphing. |
| MA.A1.PS.6: Attend to precision. | Mathematically proficient students communicate precisely to others. They use clear definitions, including correct mathematical language, in discussion with others and in their own reasoning. They state the meaning of the symbols they choose, including using the equal sign consistently and appropriately. They express solutions clearly and logically by using the appropriate mathematical terms and notation. They specify units of measure and label axes to clarify the correspondence with quantities in a problem. They calculate accurately and efficiently and check the validity of their results in the context of the problem. They express numerical answers with a degree of precision appropriate for the problem context. | Communication The ability to read, write, listen, ask questions, think, and communicate about math will develop and deepen students' understanding of mathematical concepts. Students should read text, data, tables, and graphs with comprehension and understanding. Their writing should be detailed and coherent, and they should use correct mathematical vocabulary. Students should write to explain answers, justify mathematical reasoning, and describe problem-solving strategies. | 6 Attend to precision. Mathematically proficient students try to communicate precisely to others. They try to use clear definitions in discussion with others and in their own reasoning. They state the meaning of the symbols they choose, including using the equal sign consistently and appropriately. They are careful about specifying units of measure, and labeling axes to clarify the correspondence with quantities in a problem. They calculate accurately and efficiently, express numerical answers with a degree of precision appropriate for the problem context. In the elementary grades, students give carefully formulated explanations to each other. By the time they reach high school they have learned to examine claims and make explicit use of definitions. | IAS 2014 does not distinguish between younger and older students. |

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| MA.A1.PS.7: Look for and make use of structure. | Mathematically proficient students look closely to discern a pattern or structure. They step back for an overview and shift perspective. They recognize and use properties of operations and equality. They organize and classify geometric shapes based on their attributes. They see expressions, equations, and geometric figures as single objects or as being composed of several objects. | | 7  Look for and make use of structure. Mathematically proficient students look closely to discern a pattern or structure. Young students, for example, might notice that three and seven more is the same amount as seven and three more, or they may sort a collection of shapes according to how many sides the shapes have. Later, students will see 7 × 8 equals the well remembered 7 × 5 + 7 × 3, in preparation for learning about the distributive property. In the expression x2 + 9x + 14, older students can see the 14 as 2 × 7 and the 9 as 2 + 7. They recognize the significance of an existing line in a geometric figure and can use the strategy of drawing an auxiliary line for solving problems. They also can step back for an overview and shift perspective. They can see complicated things, such as some algebraic expressions, as single objects or as being composed of several objects. For example, they can see 5 − 3(x − y)2 as 5 minus a positive number times a square and use that to realize that its value cannot be more than 5 for any real numbers x and y. | IAS 2014 has removed examples and does not distinguish between younger and older students. Both IAS 2014 and CCSS expand upon IAS 2000 by having students discern patterns, structure, geometric figures, and composition of objects. |
| MA.A1.PS.8: Look for and express regularity in repeated reasoning. | Mathematically proficient students notice if calculations are repeated and look for general methods and shortcuts. They notice regularity in mathematical problems and their work to create a rule or formula. Mathematically proficient students maintain oversight of the process, while attending to the details as they solve a problem. They continually evaluate the reasonableness of their intermediate results. | | 8  Look for and express regularity in repeated reasoning. Mathematically proficient students notice if calculations are repeated, and look both for general methods and for shortcuts. Upper elementary students might notice when dividing 25 by 11 that they are repeating the same calculations over and over again, and conclude they have a repeating decimal. By paying attention to the calculation of slope as they repeatedly check whether points are on the line through (1, 2) with slope 3, middle school students might abstract the equation (y − 2)/(x − 1) = 3. Noticing the regularity in the way terms cancel when expanding (x − 1)(x + 1), (x − 1)(x2 + x + 1), and (x − 1)(x3 + x2 + x + 1) might lead them to the general formula for the sum of a geometric series. As they work to solve a problem, mathematically proficient students maintain oversight of the process, while attending to the details. They continually evaluate the reasonableness of their intermediate results. | IAS 2014 has removed examples and does not distinguish between younger and older students. |
| | | **Real Numbers and Expressions** | | |
| MA.AI.RNE.1: | AI.RNE.1: Understand the hierarchy and relationships of numbers and sets of numbers within the real number system. | | | This standard is NEW |

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| MA.AI.RNE.2: | AI.RNE.2: Explain why the sum or product of two rational numbers is rational; that the sum of a rational number and an irrational number is irrational; and that the product of a nonzero rational number and an irrational number is irrational. | | 8.1.3 Understand that computations with an irrational number and a rational number (other than zero) produce an irrational number.  N-RN.3 Explain why the sum or product of two rational numbers are rational; that the sum of a rational number and an irrational number is irrational; and that the product of a nonzero rational number and an irrational number is irrational. | |
| MA.AI.RNE.3: | AI.RNE.3: Rewrite and evaluate numeric expressions with positive rational exponents using the properties of exponents. | A1.1.4 Use the laws of exponents for rational exponents. | N-RN.1 Explain how the definition of the meaning of rational exponents follows from extending the properties of integer exponents to those values, allowing for a notation for radicals in terms of rational exponents. | IAS2014 Expects students to be able to manipulate rational expressions |
| MA.A1.RNE.4: | AI.RNE.4: Simplify square roots of non-perfect square integers and algebraic monomials. | A1.1.2 Simplify square roots using factors. | | IAS2014 Includes algebraic monomials |
| MA.AI.RNE.5: | AI.RNE.5: Simplify algebraic rational expressions, with numerators and denominators containing monomial bases with integer exponents, to equivalent forms. | | A-APR.6 Rewrite simple rational expressions in different forms; write a(x)/b(x) in the form q(x) + r(x)/b(x), where a(x), b(x), q(x), and r(x) are polynomials with the degree of r(x) less than the degree of b(x), using inspection, long division, or, for the more complicated examples, a computer algebra system. | IAS2014 Does not specify what forms to rewrite the expressions |
| MA.AI.RNE.6: | AI.RNE.6: Factor common terms from polynomials and factor polynomials completely.  Factor the difference of two squares, perfect square trinomials, and other quadratic expressions. | A1.6.6 Find a common monomial factor in a polynomial.  A1.6.7 Factor the difference of two squares and other quadratics. | A-SSE.2 Use the structure of an expression to identify ways to rewrite it. For example, see $x^4 – y^4$ as $(x^2)^2 – (y^2)^2$, thus recognizing it as a difference of squares that can be factored as $(x^2 – y^2)(x^2 + y^2)$. | IAS2014 Includes Perfect Square Trinomials |
| MA.AI.RNE.7: | AI.RNE.7: Understand polynomials are closed under the operations of addition, subtraction, and multiplication with integers; add, subtract, and multiply polynomials and divide polynomials by monomials. | A1.6.1 Add and subtract polynomials.  A1.6.2 Multiply and divide monomials.  A1.6.4 Multiply polynomials.  A1.6.5 Divide polynomials by monomials. | A-APR.1 Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.  A-APR.7 Understand that rational expressions form a system analogous to the rational numbers, closed under addition, subtraction, multiplication, and division by a nonzero rational expression; add, subtract, multiply, and divide rational expressions. | |
| **Functions** | | | | |
| MA.AI.F.1: | AI.F.1: Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range.  Understand that if f is a function and x is an element of its domain, then f(x) denotes the output of f corresponding to the input x.  Understand the graph of f is the graph of the equation y = f(x). | A1.3.3 Understand the concept of a function, decide if a given relation is a function, and link equations to functions.  A1.3.4 Find the domain and range of a relation. | F-IF.1 Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If f is a function and x is an element of its domain, then f(x) denotes the output of f corresponding to the input x. The graph of f is the graph of the equation y = f(x). | |

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| MA.AI.F.2: | AI.F.2: Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear, has a maximum or minimum value). Sketch a graph that exhibits the qualitative features of a function that has been verbally described. Identify independent and dependent variables and make predictions about the relationship. | A1.3.1 Sketch a reasonable graph for a given relationship.  A1.3.2 Interpret a graph representing a given situation. | S-ID.6.b Represent data on two quantitative variables on a scatter plot, and describe how the variables are related. Informally assess the fit of a function by plotting and analyzing residuals. | IAS2014 Specifically states what qualities of the graph students are to describe. Students must identify the independent and dependent variables. |
| MA.AI.F.3: | AI.F.3: Identify the domain and range of relations represented in tables, graphs, verbal descriptions, and equations. | A1.3.4 Find the domain and range of a relation. | F-IF.5 Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. For example, if the function h(n) gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function. | IAS2014 Goes further to include graphs, verbal descriptions and equations. |
| MA.AI.F.4: | AI.F.4: Understand and interpret statements that use function notation in terms of a context; relate the domain of the function to its graph and to the quantitative relationship it describes. | | F-IF.2 Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context. | IAS2014 Students must interpret the statements. |
| **Linear Equations, Inequalities, and Functions** | | | | |
| MA.AI.L.1: | AI.L.1: Understand that the steps taken when solving linear equations create new equations that have the same solution as the original. Solve fluently linear equations and inequalities in one variable with integers, fractions, and decimals as coefficients. Explain and justify each step in solving an equation, starting from the assumption that the original equation has a solution. Justify the choice of a solution method. | A1.2.1 Solve linear equations.  A1.2.4 Solve linear inequalities using properties of order. | A-REI.3 Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.  A-CED.3 Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or non-viable options in a modeling context. For example, represent inequalities describing nutritional and cost constraints on combinations of different foods. | IAS2014 Students must be fluent in solving the linear equations. Students are asked to explain and justify the steps to solve the equations. |
| MA.AI.L.2: | AI.L.2: Represent real-world problems using linear equations and inequalities in one variable and solve such problems. Interpret the solution and determine whether it is reasonable. | A1.2.6 Solve word problems that involve linear equations, formulas, and inequalities. | A-CED.1 Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions. | IAS2014 Students must check their solutions for reasonability |
| MA.AI.L.3: | AI.L.3: Represent real-world and other mathematical problems using an algebraic proportion that leads to a linear equation and solve such problems. | A1.7.2 Solve algebraic proportions. | F-IF.7.a Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. Graph linear and quadratic functions and show intercepts, maxima, and minima. | IAS2014 Students should recognize proportions in context. |
| MA.AI.L.4: | AI.L.4: Represent linear functions as graphs from equations (with and without technology), equations from graphs, and equations from tables and other given information (e.g., from a given point on a line and the slope of the line). | A1.4.1 Graph a linear equation.  A1.4.4 Write the equation of a line given appropriate information.  A2.1.8 Interpret given situations as functions in graphs, formulas, and words. | | IAS2014 Combines all ways to write linear functions into one standard where the IAS2000 split all the ways separately |
| MA.AI.L.5: | AI.L.5: Represent real-world problems that can be modeled with a linear function using equations, graphs, and tables; translate fluently among these representations, and interpret the slope and intercepts. | A1.4.5 Write the equation of a line that models a data set and use the equation (or the graph of the equation) to make predictions. Describe the slope of the line in terms of the data, recognizing that the slope is the rate of change. | S-ID.7 Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data. | IAS2014 Students must be fluent in all aspects of linear functions |

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| MA.AI.L.6: | AI.L.6: Translate among equivalent forms of equations for linear functions, including slope-intercept, point-slope, and standard. Recognize that different forms reveal more or less information about a given situation. | A1.4.3 Write the equation of a line in slope-intercept form. Understand how the slope and y-intercept of the graph are related to the equation. | | IAS2014 Students must recognize when to use and what information is represented in various forms of linear functions |
| MA.AI.L.7: | AI.L.7: Represent real-world problems using linear inequalities in two variables and solve such problems; interpret the solution set and determine whether it is reasonable. Solve other linear inequalities in two variables by graphing. | A1.4.6 Graph a linear inequality in two variables.

A2.1.6 Solve an inequality by examining the graph. | A-REI.12 Graph the solutions to a linear inequality in two variables as a half-plane (excluding the boundary in the case of a strict inequality), and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes.

A-CED.3 Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or non-viable options in a modeling context. For example, represent inequalities describing nutritional and cost constraints on combinations of different foods. | IAS2014 Students must check their solutions for reasonability |
| MA.AI.L.8: | AI.L.8: Solve compound linear inequalities in one variable, and represent and interpret the solution on a number line. Write a compound linear inequality given its number line representation. | A1.2.5 Solve combined linear inequalities. | | IAS2014 Students must write compound inequalities and graph compound inequalities on a number line. |
| MA.AI.L.9: | AI.L.9: Solve absolute value linear equations in one variable. | | | This standard is NEW |
| MA.AI.L.10: | AI.L.10: Graph absolute value linear equations in two variables. | | F-IF.7.b Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions. | IAS2014 limits this standard to just absolute value. |
| MA.AI.L.11: | AI.L.11: Solve equations and formulas for a specified variable, including equations with coefficients represented by variables. | A1.2.2 Solve equations and formulas for a specified variable. | | IAS2014 goes further to include solving for variables with variable coefficients |
| **Systems of Equations and Inequalities** | | | | |
| MA.AI.SEI.1: | AI.SEI.1: Understand the relationship between a solution of a pair of linear equations in two variables and the graphs of the corresponding lines. Solve pairs of linear equations in two variables by graphing; approximate solutions when the coordinates of the solution are non-integer numbers. | A1.5.1 Use a graph to estimate the solution of a pair of linear equations in two variables.

A1.5.2 Use a graph to find the solution set of a pair of linear inequalities in two variables. | | IAS2014 Asks students to understand the relationship between the equations and the graphs of the lines |
| MA.AI.SEI.2: | AI.SEI.2: Understand that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a multiple of the other produces a system with the same solutions. Solve pairs of linear equations in two variables using substitution and elimination. | A1.5.3 Understand and use the substitution method to solve a pair of linear equations in two variables.

A1.5.4 Understand and use the addition or subtraction method to solve a pair of linear equations in two variables.

A1.5.5 Understand and use multiplication with the addition or subtraction method to solve a pair of linear equations in two variables. | | IAS2014 Combines the three Algebraic ways to solve systems of equations into one standards so skills are not taught in isolation |

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| MA.AI.SEI.3: | AI.SEI.3: Write a system of two linear equations in two variables that represents a real-world problem and solve the problem with and without technology. Interpret the solution and determine whether the solution is reasonable. | A1.5.6 Use pairs of linear equations to solve word problems. | A-REI.6 Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables. | IAS2014 Students must check their solutions for reasonability |
| MA.AI.SEI.4: | AI.SEI.4: Represent real-world problems using a system of two linear inequalities in two variables and solve such problems; interpret the solution set and determine whether it is reasonable. Solve other pairs of linear inequalities by graphing with and without technology. | | A-CED.3 Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or non-viable options in a modeling context. For example, represent inequalities describing nutritional and cost constraints on combinations of different foods. | IAS2014 Students must check their solutions for reasonability and to use technology to help graph the systems of equations |
| | | **Quadratic and Exponential Equations and Functions** | | |
| MA.AI.QE.1: | AI.QE.1: Distinguish between situations that can be modeled with linear functions and with exponential functions. Understand that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals. Compare linear functions and exponential functions that model real-world situations using tables, graphs, and equations. | | F-LQE.1.a Distinguish between situations that can be modeled with linear functions and with exponential functions. Prove that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals.<br><br>F-LQE.1.b Distinguish between situations that can be modeled with linear functions and with exponential functions. Recognize situations in which one quantity changes at a constant rate per unit interval relative to another.<br><br>F-LQE.1.c Distinguish between situations that can be modeled with linear functions and with exponential functions. Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to an-other. | IAS2014 Asks students to compare functions and how they relate to real-world situations. |
| MA.AI.QE.2: | AI.QE.2: Represent real-world and other mathematical problems that can be modeled with exponential functions using tables, graphs, and equations of the form $y = ab^x$ (for integer values of $x > 1$, rational values of $b > 0$ and $b \neq 1$ ); translate fluently among these representations and interpret the values of a and b. | | F-BF.1.b Write a function that describes a relationship between two quantities. Combine standard function types using arithmetic operations. For example, build a function that models the temperature of a cooling body by adding a constant function to a decaying exponential, and relate these functions to the model. | IAS2014 Asks students to be fluent with exponential equations in the form $y = ab^x$ |
| MA.A1.QE.3: | A1.QE.3: Graph exponential and quadratic equations in two variables with and without technology. | A1.8.1 Graph quadratic, cubic, and radical equations. | F-LQE.5 Interpret the parameters in a linear, quadratic, or exponential function in terms of a context.<br><br>F-IF.7.a Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. Graph linear and quadratic functions and show intercepts, maxima, and minima. | IAS2014 Limits this standard to only exponential and quadratic |

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**Indiana Academic Standards for Mathematics – Algebra 1**
**Adopted April 2014 – Standards Correlation Guide Document 10/02/2017**

| | Indiana Academic Standards for Mathematics – Algebra 1 Adopted April 2014 Standards Correlation Guide Document | Indiana Academic Mathematics Standard Adopted 2000 | Common Core State Standard for Mathematics | Differences From Previous Standards |
|---|---|---|---|---|
| MA.AI.QE.4: | AI.QE.4: Solve quadratic equations in one variable by inspection (e.g., for x^2 = 49), finding square roots, using the quadratic formula, and factoring, as appropriate to the initial form of the equation. | A1.8.2 Solve quadratic equations by factoring.  A1.8.3 Solve quadratic equations in which a perfect square equals a constant.  A1.8.6 Solve quadratic equations using the quadratic formula. | A-REI.4.b Solve quadratic equations in one variable. Solve quadratic equations by inspection (e.g., for x2 = 49), taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as a ± bi for real numbers a and b.  F-IF.8.a Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function. Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context. | IAS2014 Combines ways to solve quadratics into one standards so skills are not taught in isolation |
| MA.AI.QE.5: | AI.QE.5: Represent real-world problems using quadratic equations in one or two variables and solve such problems with and without technology.  Interpret the solution and determine whether it is reasonable. | A1.8.7 Use quadratic equations to solve word problems.  A1.8.9 Use graphing technology to find approximate solutions of quadratic and cubic equations. | | IAS2014 Students must check their solutions for reasonability |
| MA.AI.QE.6: | AI.QE.6: Use the process of factoring to determine zeros, lines of symmetry, and extreme values in real-world and other mathematical problems involving quadratic functions; interpret the results in the real-world contexts. | | F-IF.8.a Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function. Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context.  A-APR.3 Identify zeros of polynomials when suitable factorizations are available, and use the zeros to construct a rough graph of the function defined by the polynomial. | IAS2014 Asks students to use the attributes of quadratics in context |
| MA.AI.QE.7: | AI.QE.7: Describe the relationships among the solutions of a quadratic equation, the zeros of the function, the x-intercepts of the graph, and the factors of the expression. | A1.6.8 Understand and 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.  A2.3.4 Graph quadratic functions. Apply transformations to quadratic functions. Find and interpret the zeros and maximum or minimum value of quadratic functions. | F-IF.8.a Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function. Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context. | |
| | **Data Analysis and Statistics** | | | |
| MA.AI.DS.1: | AI.DS.1: Distinguish between random and non-random sampling methods, identify possible sources of bias in sampling, describe how such bias can be controlled and reduced, evaluate the characteristics of a good survey and well-designed experiment, design simple experiments or investigations to collect data to answer questions of interest, and make inferences from sample results. | | | This standard is NEW |

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| MA.AI.DS.2: | AI.DS.2: Graph bivariate data on a scatter plot and describe the relationship between the variables. | | S-ID.6.c Represent data on two quantitative variables on a scatter plot, and describe how the variables are related. Fit a linear function for a scatter plot that suggests a linear association. | IAS2014 Does not have students find the line of best fit like the CCSS requires |
| MA.AI.DS.3: | AI.DS.3: Use technology to find a linear function that models a relationship for a bivariate data set to make predictions; interpret the slope and y-intercept, and compute (using technology) and interpret the correlation coefficient. | | S-ID.6.c Represent data on two quantitative variables on a scatter plot, and describe how the variables are related. Fit a linear function for a scatter plot that suggests a linear association.<br><br>S-ID.7 Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.<br><br>S-ID.8 Compute (using technology) and interpret the correlation coefficient of a linear fit. | IAS2014 Asks students to make predictions from the linear functions |
| MA.AI.DS.4: | AI.DS.4: Distinguish between correlation and causation. | | S-ID.9 Distinguish between correlation and causation. | |
| MA.AI.DS.5: | AI.DS.5: Understand that patterns of association can also be seen in bivariate categorical data by displaying frequencies and relative frequencies in a two-way table.  Construct and interpret a two-way table summarizing data on two categorical variables collected from the same subjects.  Use relative frequencies calculated for rows or columns (including joint, marginal, and conditional relative frequencies) to describe possible associations and trends in the data. | | 8.SP.A.4 Understand that patterns of association can also be seen in bivariate categorical data by displaying frequencies and relative frequencies in a two-way table. Construct and interpret a two-way table summarizing data on two categorical variables collected from the same subjects. Use relative frequencies calculated for rows or columns to describe possible association between the two variables.<br><br>S-ID.5 Summarize categorical data for two categories in two-way frequency tables. Interpret relative frequencies in the context of the data (including joint, marginal, and conditional relative frequencies). Recognize possible associations and trends in the data. | |
| MA.AI.DS.6: | AI.DS.6: Understand that statistics and data are non-neutral and designed to serve a particular interest.  Analyze the possibilities for whose interest might be served and how the representations might be misleading. | | | This standard is NEW |
| | | **Unaligned Indiana Academic Mathematics Standard Adopted 2000** | **Unaligned Common Core State Standard for Mathematics** | |
| | | A1.1.1 Compare real number expressions. | N-Q.1 Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays. | |
| | | A1.1.3 Understand and use the distributive, associative, and commutative properties. | N-Q.3 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. | |
| | | A1.1.5 Use dimensional (unit) analysis to organize conversions and computations. | A-SSE.1.a Interpret expressions that represent a quantity in terms of its context. Interpret parts of an expression, such as terms, factors, and coefficients. | |

| Indiana Academic Standards for Mathematics – Algebra 1 Adopted April 2014 Standards Correlation Guide Document | Indiana Academic Mathematics Standard Adopted 2000 | Common Core State Standard for Mathematics | Differences From Previous Standards |
|---|---|---|---|
| | A1.2.3 Find solution sets of linear inequalities when possible numbers are given for the variable. | A-SSE.1.b Interpret expressions that represent a quantity in terms of its context. Interpret complicated expressions by viewing one or more of their parts as a single entity. For example, interpret P(1+r)n as the product of P and a factor not depending on P. | |
| | A1.4.2 Find the slope, x-intercept, and y-intercept of a line given its graph, its equation, or two points on the line. | A-SSE.3.b Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines. | |
| | A1.6.3 Find powers and roots of monomials (only when the answer has an integer exponent). | A-CED.2 Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales. | |
| | A1.8.8 Solve equations that contain radical expressions. | A-CED.4 Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. For example, rearrange Ohm's law V = IR to highlight resistance R. | |
| | A1.9.7 Identify the hypothesis and conclusion in a logical deduction. | A-REI.5 Prove that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a multiple of the other produces a system with the same solutions. | |
| | | A-REI.10 Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line). | |
| | | F-LQE.3 Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratic ally, or (more generally) as a polynomial function. | |
| | | S-ID.3 Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers). | |
| | | S-ID.6.a Represent data on two quantitative variables on a scatter plot, and describe how the variables are related. Fit a function to the data; use functions fitted to data to solve problems in the context of the data. Use given functions or choose a function suggested by the context. Emphasize linear, quadratic, and exponential models. | |