



Indiana Department of Education

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Indiana Academic Standards 2020 Algebra I Standards Correlation Guidance Document

Intentional alignment of instructional practices and curricular materials to the Indiana Academics Standards (IAS) is vital to improving student outcomes. This guide is meant to encourage strong standards-based instruction when utilizing curricular materials not aligned to IAS but to Common Core State Standards (CCSS). Purchased curricula are not designed to perfectly align with IAS and often align with CCSS. Use of this guide will ensure strong alignment to IAS and foster critical conversations around instructional decisions.

Considerations for use:

- Identify the desired IAS;
- Unpack the IAS, referencing the IDOE Math Framework;
- Determine the correlating CCSS;
- Consider the differences between IAS and learning objective from CCSS aligned curricular material;
- Identify instructional gaps (in content or complexity) and consider strategies to supplement; and
- Prioritize content in curricular material that is identified in the IAS.

IDOE's [Math Framework](#) provides student success criteria, vertical planning, digital resources, and clarifying examples to consider when planning, implementing, and teaching IAS.

Indiana Academic Standards (IAS) 2020	Common Core State Standards (CCSS)	Difference Between IAS 2020 and CCSS
Process Standards for Mathematics		
<p>PS.1: Make sense of problems and persevere in solving them.</p> <p>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.</p>	<p>MP1: Make sense of problems and persevere in solving them.</p> <p>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.</p>	<p>IAS removes criteria involving a graphing calculator and does not distinguish between younger and older students.</p>

	<p>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.</p>	
<p>PS.2: Reason abstractly and quantitatively.</p> <p>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.</p>	<p>MP.2: Reason abstractly and quantitatively.</p> <p>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.</p>	<p><i>No content differences identified.</i></p>

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.

MP.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,

IAS includes the justification of statements that are true always, sometimes, or never. IAS includes collaboration in a mathematics community and does not distinguish between younger and older students.

	and ask useful questions to clarify or improve the arguments.	
<p>PS.4: Model with mathematics.</p> <p>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.</p>	<p>MP.4: Model with mathematics.</p> <p>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.</p>	<p>IAS does not distinguish between younger and older students.</p>

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.

MP.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 does not distinguish between younger and older students.

<p>PS.6: Attend to precision.</p> <p>Mathematically proficient students communicate precisely to others. They use clear definitions, including precision, 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.</p>	<p>MP.6: Attend to precision.</p> <p>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.</p>	<p>IAS does not distinguish between younger and older students.</p>
<p>PS.7: Look for and make use of structure.</p> <p>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.</p>	<p>MP.7: Look for and make use of structure.</p> <p>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 $7 \times 5 + 7 \times 3$, in preparation for learning about the distributive property. In the expression $x^2 + 9x + 14$, older students can see the 14 as 2×7 and the 9 as $2 + 7$. They recognize the significance of an</p>	<p>IAS has removed examples and does not distinguish between younger and older students.</p>

	<p>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.</p>	
<p>PS.8: Look for and express regularity in repeated reasoning.</p> <p>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.</p>	<p>MP.8: Look for and express regularity in repeated reasoning.</p> <p>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 $(x - 1)(x + 1)$, $(x - 1)(x^2 + x + 1)$, and $(x - 1)(x^3 + x^2 + x + 1)$ 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</p>	<p>IAS has removed examples and does not distinguish between younger and older students.</p>

	evaluate the reasonableness of their intermediate results.	
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Indiana Academic Standards (IAS) 2020	Common Core State Standards (CCSS)	Difference Between IAS 2020 and CCSS
Data Analysis and Statistics		
<p>AI.DS.1: Understand statistics as a process for making inferences about a population based on a random sample from that population. Recognize the purposes of and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each.</p>	<p>HSS.IC.A.1: Understand statistics as a process for making inferences about population parameters based on a random sample from that population.</p> <p>HSS.IC.B.3: Recognize the purposes of and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each.</p>	<p><i>No content differences identified.</i></p>
<p>AI.DS.2: 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.</p>	<p><i>No CCSS equivalent.</i></p>	
<p>AI.DS.3: Use technology to find a linear function that models a relationship between two quantitative variables to make predictions, and interpret the slope and y-intercept. Using technology, compute and interpret the correlation coefficient.</p>	<p>8.SPA.3: Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept.</p> <p>HSS.ID.B.6: Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.</p> <p>HSS.ID.B.6.A: Fit a function to the data; use functions fitted to data to solve problems in the context of data. Use given functions or choose a function suggested by the context.</p>	<p>IAS emphasizes the use of technology.</p>

	<p>Emphasize linear, quadratic, and exponential models.</p> <p>HSS.ID.B.6.C: Fit a linear function for a scatter plot that suggests a linear association</p> <p>HSS.ID.C.7: Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.</p> <p>HSS.ID.C.8: Compute (using technology) and interpret the correlation coefficient of a linear fit.</p>	
<p>AI.DS.4: Distinguish between correlation and causation.</p>	<p>HSS.ID.C.9: Distinguish between correlation and causation.</p>	<p><i>No content differences identified.</i></p>
<p>AI.DS.5: Summarize bivariate categorical data in two-way frequency tables. Interpret relative frequencies in the contexts of the data (including joint, marginal, and conditional relative frequencies). Recognize possible associations and trends in data.</p>	<p>HSS.ID.B.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.</p>	<p><i>No content differences identified.</i></p>

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Number Systems and Expressions		
<p>AI.NE.1: Explain the hierarchy and relationships of numbers and sets of numbers within the complex number system. Know that there is an imaginary number, i, such that $\sqrt{-1} = i$. Understand that the imaginary numbers along with the real numbers form the complex number system.</p>	<p>8.NS.A.1: Know that numbers that are not rational are called irrational. Understand informally that every number has a decimal expansion; for rational numbers show that the decimal expansion repeats eventually, and convert a decimal expansion which repeats eventually into a rational number.</p> <p>HSN.CN.A.1: Know there is a complex number i such that $i^2 = -1$, and every complex number has the form $a + bi$ with a and b real.</p>	<p>IAS includes understanding numbers and sets within the complex number system; does not require conversion of decimals and rational numbers.</p>
<p>AI.NE.2: Simplify algebraic rational expressions, with numerators and denominators containing monomial bases with integer exponents, to equivalent forms.</p>	<p>8.EE.A.1: Know and apply the properties of integer exponents to generate equivalent numerical expressions.</p>	<p>IAS specifies algebraic rational expressions.</p>
<p>AI.NE.3: Simplify square roots of monomial algebraic expressions, including non-perfect squares.</p>	<p><i>No CCSS equivalent.</i></p>	
<p>AI.NE.4: Factor quadratic expressions (including the difference of two squares, perfect square trinomials and other quadratic expressions).</p>	<p>HSA.SSE.A.2: Use the structure of an expression to identify ways to rewrite it.</p> <p>HSA.SSE.B.3.A: Factor a quadratic expression to reveal the zeros of the function it defines.</p>	<p>IAS does not require students to find the zeros of a function after factoring.</p>

<p>AI.NE.5: Add, subtract, and multiply polynomials. Divide polynomials by monomials.</p>	<p>HSA.APR.A.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.</p>	<p>IAS does not require an understanding of closure; adds division of polynomials by monomials.</p>
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Functions		
<p>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 $y = f(x)$ with points of the form $(x, f(x))$.</p>	<p>HSF.IF.A.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 $y = f(x)$.</p>	<p><i>No content differences identified.</i></p>
<p>AI.F.2: Evaluate functions for given elements of its domain, and interpret statements in function notation in terms of a context.</p>	<p>HSF.IF.A.2: Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.</p>	<p><i>No content differences identified.</i></p>
<p>AI.F.3: Identify the domain and range of relations represented in tables, graphs, verbal descriptions, and equations.</p>	<p>HSF.FI.B.5: Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.</p>	<p>IAS includes relations; encompasses tables, graphs, verbal descriptions, and equations.</p>
<p>AI.F.4: Describe, qualitatively, the functional relationship between two quantities by analyzing key features of a graph. Sketch a graph that exhibits given key features of a function that has been verbally described, including intercepts, where the function is increasing or decreasing, where the function is positive or negative, and any relative</p>	<p>8.F.B.5: Describe qualitatively the functional relationship between two quantities by analyzing a graph. Sketch a graph that exhibits the qualitative features of a function that has been described verbally.</p> <p>HSF.FI.B.4: For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs</p>	<p>IAS includes the identification of the independent and dependent variables; does not include symmetry, end behavior, and periodicity.</p>

<p>maximum or minimum values. Identify the independent and dependent variables.</p>	<p>showing key features given a verbal description of the relationship. Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.</p>	
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Linear Equations, Inequalities, and Functions		
<p>AI.L.1: Represent real-world problems using linear equations and inequalities in one variable, including those with rational number coefficients and variables on both sides of the equal sign. Solve them fluently, explaining the process used and justifying the choice of a solution method.</p>	<p>HSA.CED.A.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.</p> <p>HSA.REI.A.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.</p> <p>HSA.REI.B.3: Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.</p>	<p>IAS is limited to linear equations and inequalities; does not include coefficients represented by letters; specifies inclusion of variables on both sides of the equal sign.</p>
<p>AI.L.2: 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.</p>	<p><i>No CCSS equivalent.</i></p>	
<p>AI.L.3: 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). Find the</p>	<p>HSF.LE.A.2: Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).</p>	<p>IAS is limited to linear functions; does not require students to prove the slope criteria for parallel and perpendicular lines; does not limit to geometric problems.</p>

<p>equation of a line, passing through a given point, that is parallel or perpendicular to a given line.</p>	<p>HSG.GPE.B.5: Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems (e.g., find the equation of a line parallel or perpendicular to a given line that passes through a given point).</p>	
<p>AI.L.4: 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.</p>	<p>8.F.B.4: Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (x, y) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values.</p>	<p>IAS requires students to be able to translate between representations fluently.</p>
<p>AI.L.5: 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.</p>	<p>HSA.SSE.B.3: Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.</p> <p>HSF.IF.C.8: Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.</p>	<p>IAS is limited to linear functions.</p>
<p>AI.L.6: Represent real-world problems using linear inequalities in two variables and solve such problems; interpret the solution set and determine whether it is reasonable. Graph</p>	<p>HSA.REI.D.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</p>	<p>IAS requires students to represent real-world problems; does not include systems of linear inequalities in two variables.</p>

<p>the solutions to a linear inequality in two variables as a half-plane.</p>	<p>in two variables as the intersection of the corresponding half-planes.</p>	
<p>AI.L.7: Solve linear and quadratic equations and formulas for a specified variable to highlight a quantity of interest, using the same reasoning as in solving equations.</p>	<p>HSA.CED.A.4: Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations.</p> <p>HSA.REI.B.3: Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.</p>	<p>IAS is limited to linear and quadratic equations and formulas.</p>

Indiana Academic Standards (IAS) 2020	Common Core State Standards (CCSS)	Difference Between IAS 2020 and CCSS
Systems of Linear Equations and Inequalities		
<p>AI.SEI.1: Understand the relationship between a solution of a system of two 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.</p>	<p>8.EE.C.8.A: Understand that solutions to a system of two linear equations in two variables correspond to points of intersection of their graphs, because points of intersection satisfy both equations simultaneously.</p> <p>A.REI.6: Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.</p> <p>A.REI.11: Explain why the x-coordinates of the points where the graphs of the equations $y = f(x)$ and $y = g(x)$ intersect are the solutions of the equation $f(x) = g(x)$; find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where $f(x)$ and/or $g(x)$ are linear, polynomial, rational, absolute value, exponential, and logarithmic functions.</p>	<p>IAS is limited to systems of linear equations.</p>
<p>AI.SEI.2: Verify 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, including cases with no solution and infinitely many solutions. Solve</p>	<p>8.EE.C.8.B: Solve systems of two linear equations in two variables algebraically, and estimate solutions by graphing the equations. Solve simple cases by inspection.</p>	<p>IAS specifies that students can solve systems of equations with elimination and substitution methods; explicitly includes cases with no solution and infinitely many solutions.</p>

<p>systems of two linear equations algebraically using elimination and substitution methods.</p>	<p>HSA.REI.C.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.</p>	
<p>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.</p>	<p>HSA.CED.A.2: Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.</p> <p>A.CED.A.3: Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context.</p> <p>HSA.REI.C.6: Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.</p>	<p>IAS is limited to linear equations.</p>
<p>AI.SEI.4: Represent real-world problems using a system of two linear inequalities in two variables. Graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes with and without technology. Interpret the solution set and determine whether it is reasonable.</p>	<p>HSA.REI.D.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.</p> <p>HSA.CED.A.3: Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context.</p>	<p>IAS is limited to linear inequalities.</p>

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Quadratic and Exponential Equations and Functions		
<p>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.</p>	<p>HSF.LE.A.1: Distinguish between situations that can be modeled with linear functions and with exponential functions.</p> <p>HSF.LE.A.1.A: Prove that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals.</p> <p>HSF.IF.C.9: Compare properties of two functions each represented in a different way (algebraically, numerically in tables, or by verbal descriptions).</p>	<p>IAS requires students to compare linear and exponential functions that model real-world situations using tables, graphs, and equations; does not require students to construct linear and exponential functions; does not require an understanding or exposure to arithmetic and geometric sequences.</p>
<p>AI.QE.2: Represent real-world and other mathematical problems that can be modeled with simple 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 $b \neq 1$) with and without technology; interpret the values of a and b.</p>	<p>HSA.CED.A.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.</p> <p>HSF.LE.A.2: Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).</p>	<p>IAS is limited to simple exponential functions.</p>

	HSF.LE.B.5: Interpret the parameters in a linear or exponential function in terms of a context.	
AI.QE.3: Use area models to develop the concept of completing the square to solve quadratic equations. Explore the relationship between completing the square and the quadratic formula.	HSA.REI.B.4.A: Use the method of completing the square to transform any quadratic equation in x into an equation of the form $(x - p)^2 = q$ that has the same solutions. Derive the quadratic formula from this form.	IAS includes the development of the concept of completing the square through the use of area models; does not require students to derive the quadratic formula.
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.	HSA.REI.B.4.B: Solve quadratic equations by inspection (e.g., for $x^2 = 49$), 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 $a \pm bi$ for real numbers a and b .	IAS does not include completing the square; does not require students to write complex solutions.
AI.QE.5: Represent real-world problems using quadratic equations in one or two variables and solve such problems with technology. Interpret the solution(s) and determine whether they are reasonable.	HSA.CED.A.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. HSA.REI.B.4: Solve quadratic equations in one variable. A.REI.B.4.B: Solve quadratic equations by inspection (e.g., for $x^2 = 49$), taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when	IAS is limited to quadratic equations.

	the quadratic formula gives complex solutions and write them as $a \pm bi$ for real numbers a and b .	
AI.QE.6: Graph exponential and quadratic functions with and without technology. Identify and describe key features, such as zeros, lines of symmetry, and extreme values in real-world and other mathematical problems involving quadratic functions with and without technology; interpret the results in the real-world contexts.	<p>HSF.IF.C.7.A: Graph linear and quadratic functions and show intercepts, maxima, and minima.</p> <p>F.IF.8.a: 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.</p> <p>HSF.IF.C.7.E: Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.</p>	IAS does not include linear functions; excludes logarithmic functions; excludes trigonometric functions.
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. Explain that every quadratic has two complex solutions, which may or may not be real solutions.	HSA.SSE.B.3.A: Factor a quadratic expression to reveal the zeros of the function it defines.	IAS requires students to understand the relationship between solutions, zeroes, x-intercepts, and factors; requires students to understand that all quadratics have two complex solutions but does not require that they find non-real solutions.