

Algebra I Blueprint and FAL Alignment

Reporting Category: Number, Quantities, Expressions, and Equations

Critical Areas of Focus

- A.SSE.1ab Interpret expressions that represent a quantity in terms of its context. Interpret parts of an expression, such as terms, factors, and coefficients. Interpret complicated expressions by viewing one or more of their parts as a single entity.
- A.SSE.2 Use the structure of an expression to identify ways to rewrite it
- A.CED.1 Create equations and inequalities in one variable and use them to solve problems.
- A.CED.2 Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.
- A.CED.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.
- A.CED.4 Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations.
- 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.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.
- A.REI.3 Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.
- A.REI.4ab Solve quadratic equations in one variable. 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. 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.

Associated FALs

Maximizing Profits: Selling Boomerangs

This lesson unit is intended to help you assess how well students are able to:

- Interpret a situation and represent the constraints and variables mathematically.
- Select appropriate mathematical methods to use.
- Explore the effects of systematically varying the constraints.
- Interpret and evaluate generated data and identify the optimum case, checking it for confirmation.
- Communicate their reasoning clearly.

Source: map.mathshell.org

Sorting Equations and Identities

This lesson unit is intended to help you assess how well students are able to:

- Recognize the differences between equations and identities.
- Substitute numbers into algebraic statements in order to test their validity in special cases.
- Resist common errors when manipulating expressions such as $2(x - 3) = 2x - 3$; $(x + 3)^2 = x^2 + 3^2$.
- Carry out correct algebraic manipulations.

Interpreting Algebraic Expressions

This lesson unit is intended to help you assess how well students are able to translate between words, symbols, tables, and area representations of algebraic expressions. It will help you to identify and support students who have difficulty:

- Recognizing the order of algebraic operations.
- Recognizing equivalent expressions.
- Understanding the distributive laws of multiplication and division over addition (expansion of parentheses).

Generating Polynomials from Patterns

This lesson unit is intended to help you assess how well students are able to manipulate and calculate with polynomials. In particular, it aims to identify and help students who have difficulties in:

- Switching between visual and algebraic representations of polynomial expressions.
- Performing arithmetic operations on algebraic representations of polynomials, factorizing and expanding appropriately when it helps to make the operations easier.

Solving Linear Equations in Two Variables

This lesson unit is intended to help you assess how well students are able to formulate and solve problems using algebra and in particular, to identify and help students who have the following difficulties:

- Solving a problem using two linear equations with two variables.
- Interpreting the meaning of algebraic expressions.

Reporting Category: Functions

Critical Areas of Focus

- 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).
- 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.
- 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.
- 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 $y = f(x)$.
- 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.
- F.IF.3 Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers.
- F.IF.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 showing key features given a verbal description of the relationship.
- F.IF.5 Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.
- F.IF.6 Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.

Associated FAls

Representing Quadratic Functions Graphically

This lesson unit is intended to help you assess how well students are able to understand what the different algebraic forms of a quadratic function reveal about the properties of its graphical representation. In particular, the lesson will help you identify and help students who have the following difficulties:

- Understanding how the factored form of the function can identify a graph's roots.
- Understanding how the completed square form of the function can identify a graph's maximum or minimum point.
- Understanding how the standard form of the function can identify a graph's intercept.

Source: map.mathshell.org

Representing Functions of Everyday Situations

This lesson unit is intended to help you assess how well students are able to:

- Articulate verbally the relationships between variables arising in everyday contexts.
- Translate between everyday situations and sketch graphs of relationships between variables.
- Interpret algebraic functions in terms of the contexts in which they arise.
- Reflect on the domains of everyday functions and in particular whether they should be discrete or continuous.

Representing Inequalities Graphically

This lesson unit is intended to help you assess how well students are able to use linear inequalities to create a set of solutions. In particular, the lesson will help you identify and assist students who have difficulties in:

- Representing a constraint by shading the correct side of the inequality line.
- Understanding how combining inequalities affects a solution space.

Reporting Category: Statistics

Critical Areas of Focus

- S.ID.7 Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.
- S.ID.8 Compute (using technology) and interpret the correlation coefficient of a linear fit.
- S.ID.9 Distinguish between correlation and causation.

Associated FAls

Devising a Measure: Correlation

This lesson unit is intended to help you assess how well students understand the notion of positive correlation. In particular this unit aims to identify and help students who have difficulty in:

- Understanding correlation as the degree of fit between two variables.
- Making a mathematical model of a situation.
- Testing and improving the model.
- Communicating their reasoning clearly.
- Evaluating alternative models of the situation.