

Algebra I

Adopted 2023

Number and Quantity

Quantities

- A. Reason quantitatively and use units to understand problems. [A1.N.Q.A](#)
 - 1. Use units as a way to understand real-world problems. [A1.N.Q.A.1](#)
 - a. Choose and interpret the scale and the origin in graphs and data displays, [A1.N.Q.A.1.A](#)
 - b. Use appropriate quantities in formulas, converting units as necessary. [A1.N.Q.A.1.B](#)
 - c. Define and justify appropriate quantities within a context for the purpose of modeling. [A1.N.Q.A.1.C](#)
 - d. Choose an appropriate level of accuracy when reporting quantities. [A1.N.Q.A.1.D](#)

Algebra

Seeing Structure in Expressions

- A. Interpret the structure of expressions. [A1.A.SSE.A](#)
 - 1. Interpret expressions that represent a quantity in terms of its context. [A1.A.SSE.A.1](#)
 - a. Interpret parts of an expression, such as terms, factors, and coefficients. [A1.A.SSE.A.1.A](#)
 - b. Interpret complicated expressions by viewing one or more of their parts as a single entity. [A1.A.SSE.A.1.B](#)

Arithmetic with Polynomials and Rational Expressions

- A. Perform arithmetic operations on polynomials. [A1.A.APR.A](#)
 - 1. Add, subtract, and multiply polynomials. Use these operations to demonstrate that polynomials form a closed system that adhere to the same properties of operations as the integers. [A1.A.APR.A.1](#)

Creating Equations

A. Create equations that describe numbers or relationships. [A1.A.CED.A](#)

1. Create equations and inequalities in one variable and use them to solve problems in a real-world context. [A1.A.CED.A.1](#)
 2. Create equations and inequalities in two variables to represent relationships between quantities and use them to solve problems in a real-world context. Graph equations with two variables on coordinate axes with labels and scales, and use the graphs to make predictions. [A1.A.CED.A.2](#)
 3. Create individual and systems of equations and/or inequalities to represent constraints in a contextual situation, and interpret solutions as viable or non-viable. [A1.A.CED.A.3](#)
 4. Rearrange formulas to isolate a quantity of interest using algebraic reasoning. [A1.A.CED.A.4](#)
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Reasoning with Equations and Inequalities

A. Understand solving equations as a process of reasoning and explain the reasoning. [A1.A.REI.A](#)

1. Understand solving equations as a process of reasoning and explain the reasoning. Construct a viable argument to justify a solution method. [A1.A.REI.A.1](#)

B. Solve equations and inequalities in one variable. [A1.A.REI.B](#)

2. Solve linear and absolute value equations and inequalities in one variable. [A1.A.REI.B.2](#)
 - a. Solve linear equations and inequalities, including compound inequalities, in one variable. Represent solutions algebraically and graphically. [A1.A.REI.B.2.A](#)
 - b. Solve absolute value equations and inequalities in one variable. Represent solutions algebraically and graphically. [A1.A.REI.B.2.B](#)
3. Solve quadratic equations and inequalities in one variable. [A1.A.REI.B.3](#)
 - a. Solve quadratic equations by inspection (e.g., for $x^2 = 49$), taking square roots, knowing and applying the quadratic formula, and factoring, as appropriate to the initial form of the equation. Recognize when a quadratic equation has solutions that are not real numbers. [A1.A.REI.B.3.A](#)
 - b. Solve quadratic inequalities using the graph of the related quadratic equation. [A1.A.REI.B.3.B](#)

C. Solve systems of equations. [A1.A.REI.C](#)

4. Write and solve a system of linear equations in real-world context. [A1.A.REI.C.4](#)

- D. Represent and solve equations and inequalities graphically. **A1.A.REI.D**
5. 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). **A1.A.REI.D.5**
 6. 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 approximate solutions by graphing the functions or making a table of values, using technology when appropriate. **A1.A.REI.D.6**
 7. Graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes. **A1.A.REI.D.7**
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Functions

Interpreting Functions

- A. Understand the concept of a function and use function notation. **A1.F.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 $y = f(x)$. **A1.F.IF.A.1**
 2. Use function notation. **A1.F.IF.A.2**
 - a. Use function notation to evaluate functions for inputs in their domains, including functions of two variables. **A1.F.IF.A.2.A**
 - b. Interpret statements that use function notation in terms of a context. **A1.F.IF.A.2.B**
 3. Understand geometric formulas as functions. **A1.F.IF.A.3**
- B. Interpret functions that arise in applications in terms of the context. **A1.F.IF.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 showing key features given a verbal description of the relationship. **A1.F.IF.B.4**
 5. Relate the domain of a function to its graph and, where applicable, to the context of the function it models. **A1.F.IF.B.5**
 6. Calculate and interpret the average rate of change of a function (presented algebraically or as a table) over a specified interval. Estimate and interpret the rate of change from a graph. **A1.F.IF.B.6**

- C. Analyze functions using different representations. **A1.F.IF.C**
8. Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function. **A1.F.IF.C.8**
 - a. Rewrite quadratic functions to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a real-world context. **A1.F.IF.C.8.A**
 9. Compare properties of functions represented algebraically, graphically, numerically in tables, or by verbal descriptions. **A1.F.IF.C.9**
 - a. Compare properties of two different functions. Functions may be of different types and/or represented in different ways. **A1.F.IF.C.9.A**
 - b. Compare properties of the same function on two different intervals or represented in two different ways. **A1.F.IF.C.9.B**
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Building Functions

- A. Build a function that models a relationship between two quantities. **A1.F.BF.A**
1. Build a function that describes a relationship between two quantities. **A1.F.BF.A.1**
 - a. Determine steps for calculation, a recursive process, or an explicit expression from a context. **A1.F.BF.A.1.A**
- B. Build new functions from existing functions. **A1.F.BF.B**
2. Identify the effect on the graph of replacing $f(x)$ by $f(x) + k$, $k f(x)$, $f(kx)$, and $f(x + k)$ for specific values of k (both positive and negative); find the value of k given graphs. **A1.F.BF.B.2**
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Linear and Exponential Functions

- A. Construct and compare linear and exponential models and solve problems. **A1.F.LE.A**
1. Distinguish between situations that can be modeled with linear functions and with exponential functions. **A1.F.LE.A.1**
 - a. Know that linear functions grow by equal differences over equal intervals and that exponential functions grow by equal factors over equal intervals. **A1.F.LE.A.1.A**
 - b. Recognize situations in which one quantity changes at a constant rate per unit interval relative to another. **A1.F.LE.A.1.B**
 - c. Recognize situations in which a quantity grows or decays by a constant factor per unit interval relative to another. **A1.F.LE.A.1.C**
 2. Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a table, a description of a relationship, or input-output pairs. **A1.F.LE.A.2**
- B. Interpret expressions for functions in terms of the situation they model. **A1.F.LE.B**
3. Interpret the parameters in a linear or exponential function in terms of a context. **A1.F.LE.B.3**
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Statistics and Probability

Interpreting Categorical and Quantitative Data

- A. Summarize, represent, and interpret data on a single count or measurement variable. **A1.S.ID.A**
 - 1. Use measures of center to solve real world and mathematical problems. **A1.S.ID.A.1**
 - 2. Use statistics appropriate to the shape of the data distribution to compare center (mean, median, and/or mode) and spread (range, interquartile range) of two or more different data sets. **A1.S.ID.A.2**
 - 3. Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points. **A1.S.ID.A.3**
- B. Summarize, represent, and interpret data on two categorical and quantitative variables. **A1.S.ID.B**
 - 4. Represent data from 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. **A1.S.ID.B.4**
- C. Interpret linear models. **A1.S.ID.C**
 - 5. Interpret the rate of change and the constant term of a linear model in the context of data. **A1.S.ID.C.5**
 - 6. Use technology to compute the correlation coefficient of a linear model; interpret the correlation coefficient in the context of the data. **A1.S.ID.C.6**
 - 7. Explain the differences between correlation and causation. Recognize situations where an additional factor may be affecting correlated data. **A1.S.ID.C.7**