# West Virginia Algebra I

# Practice Workbook

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## 2026

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Reza Nazari

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# 2026

## The Most Comprehensive Review of Algebra I

**By**

Reza Nazari

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| Linear and Exponential Relationships | |
|---|---|
| **Cluster** | **Extend the properties of exponents to rational exponents.** |
| M.A1HS.11 | 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. (e.g., We define $5^{1/3}$ to be the cube root of 5 because we want $(5^{1/3})^3 = 5^{\left(\frac{1}{3}\right)3}$ to hold, so $(5^{1/3})^3$ must equal 5.) |
| M.A1HS.12 | Rewrite expressions involving radicals and rational exponents using the properties of exponents. |
| **Cluster** | **Solve systems of equations.** |
| M.A1HS.13 | 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. |
| M.A1HS.14 | Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables. |
| **Cluster** | **Represent and solve equations and inequalities graphically** |
| M.A1HS.15 | Recognize 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). |
| M.A1HS.16 | 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. |
| M.A1HS.17 | 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 halfplanes. |
| **Cluster** | **Understand the concept of a function and use function notation.** |
| M.A1HS.18 | Recognize 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 $y = f(x)$. |
| M.A1HS.19 | Use function notation, evaluate functions for inputs in their domains and interpret statements that use function notation in terms of a context. |
| M.A1HS.20 | Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers. (e.g., The Fibonacci sequence is defined recursively by $f(0) = f(1) = 1, f(n+1) = f(n) + f(n-1)$ for $n \geq 1$. |

| **Cluster** | **Interpret functions that arise in applications in terms of a context.** |
|---|---|
| M.A1HS.21 | 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. Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity. |
| M.A1HS.22 | Relate the domain of a function to its graph and where applicable, to the quantitative relationship it describes. (e.g., 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.) |
| M.A1HS.23 | 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. |
| **Cluster** | **Analyze functions using different representations.** |
| M.A1HS.24 | Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.<br>a. Graph linear and quadratic functions and show intercepts, maxima, and minima.<br>b. Graph exponential and logarithmic functions, showing intercepts and end behavior and trigonometric functions, showing period, midline and amplitude. |
| M.A1HS.25 | Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). (e.g., Given a graph of one quadratic function and an algebraic expression for another, say which has the larger maximum.) |
| **Cluster** | **Build a function that models a relationship between two quantities.** |
| M.A1HS.26 | Write a function that describes a relationship between two quantities.<br>a. Determine an explicit expression, a recursive process, or steps for calculation from a context.<br>b. Combine standard function types using arithmetic operations. (e.g., 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.) |
| M.A1HS.27 | Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms. |
| **Cluster** | **Build new functions from existing functions.** |
| M.A1HS.28 | 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 the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them. |

| | |
|---|---|
| **Cluster** | **Construct and compare linear, quadratic, and exponential models and solve problems.** |
| M.A1HS.29 | Distinguish between situations that can be modeled with linear functions and with exponential functions.<br>a. Prove that linear functions grow by equal differences over equal intervals; exponential functions grow by equal factors over equal intervals.<br>b. Recognize situations in which one quantity changes at a constant rate per unit interval relative to another.<br>c. Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another. |
| M.A1HS.30 | 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). |
| M.A1HS.31 | Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function. |
| **Cluster** | **Interpret expressions for functions in terms of the situation they model.** |
| M.A1HS.32 | Interpret the parameters in a linear or exponential function in terms of a context. |
| **Cluster** | **Summarize, represent, and interpret data on a single count or measurement variable.** |
| M.A1HS.33 | Represent data with plots on the real number line (dot plots, histograms, and box plots). |
| M.A1HS.34 | Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets. |
| M.A1HS.35 | Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers). |
| **Cluster** | **Summarize, represent, and interpret data on two categorical and quantitative variables.** |
| M.A1HS.36 | 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. |
| M.A1HS.37 | Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.<br>a. 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 and exponential models.<br>b. Informally assess the fit of a function by plotting and analyzing residuals. |

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# Chapter 1: Fundamentals and Building Blocks



**Math Topics that you'll learn in this Chapter:**

- ✓ Adding and Subtracting Integers
- ✓ Multiplying and Dividing Integers
- ✓ Translate Phrases into an Algebraic Statement
- ✓ Order of Operations
- ✓ Integers and Absolute Value
- ✓ Proportional Ratios
- ✓ Similarity and Ratios
- ✓ Percent Problems
- ✓ Percent of Increase and Decrease
- ✓ Discount, Tax, and Tip
- ✓ Simple Interest
- ✓ The Distributive Property
- ✓ Approximating Irrational Numbers

