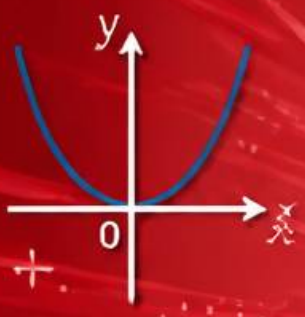
$y = mx + b$ x^2 $(a + b)^2$

ARKANSAS ATLAS

$2x - 3 = 7$ $x - y = 4$







x $\sqrt{x}$ y

$(x - 2)^2$ $x^2 + y^2 = r^2$

$y = x^2$



ALGEBRA I

MADE RIDICULOUSLY SIMPLE



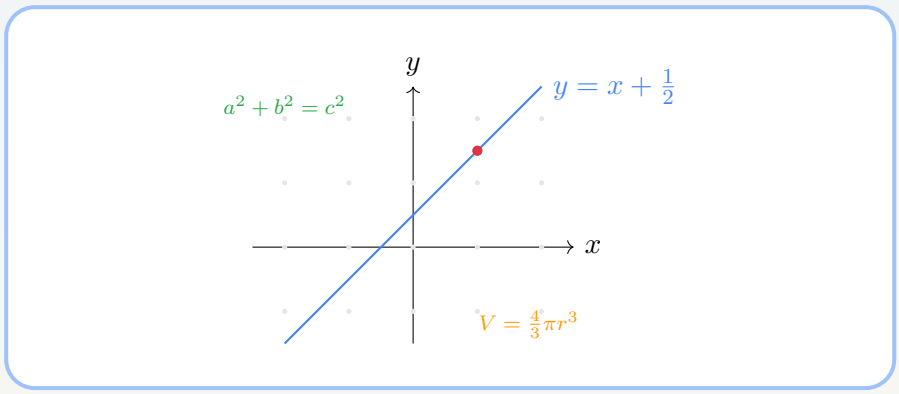
$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ $( )$ $ax + by = c$

★ THE ULTIMATE STUDY GUIDE TO ACE ALGEBRA I ★

Arkansas ATLAS Algebra I

Made Ridiculously Simple

Comprehensive Practice, Challenging Exercises, and Strategic Guidance for Complete Test-Day Confidence



Reza Nazari

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6.ALG.8	Write, solve, and graph one-step inequalities in real-world and mathematical problems.
6.GM.4	Find and graph pairs of rational numbers in all four quadrants of the coordinate plane in real-world and mathematical problems.
6.NCC.4	Interpret the absolute value of numbers for positive or negative quantities in a real-world context.
6.NCC.11	Solve real-world and mathematical problems with the greatest common factor of two whole numbers less than or equal to 100.
6.PR.2	Calculate unit rates to include unit pricing and constant speed.
6.SP.2	Calculate and interpret any measure of center (mean, median, and mode) of a numerical data set.
6.SP.3	Determine which measure of center (mean or median) is more appropriate to describe the center of data and justify the choice.
6.SP.5	Calculate and interpret the measure of variation [range and interquartile range (IQR)] of a numerical data set.
6.SP.7	Represent numerical data on a number line, histogram, and box plot.
6.SP.8	Calculate the relative frequency of an interval of data values when given a histogram.
7.ALG.2	Model and solve fluently two-step equations in real-world or mathematical problems.
7.ALG.4	Write an equation to express two quantities in terms of the dependent and independent variables.
7.PR.4	Determine whether two quantities represent proportional relationships by using equivalent ratios in a table and by graphing on a coordinate plane.
8.ALG.3	Analyze and solve systems of linear equations in the form $y = mx + b$ in real-world or mathematical contexts, graphically and algebraically.
8.FN.4	Compare the rate of change (slope) and y-intercept (initial value) of two linear functions each represented in different forms.
8.FN.5	Distinguish between linear and nonlinear functions by comparing graphs and equations.
8.FN.7	Interpret and explain the meaning of the rate of change (slope) and y-intercept (initial value) of a linear relationship in a real-world context.
8.NCC.3	Know and apply the properties of integer exponents to generate equivalent numerical expressions.

A1.EFE.3	Construct exponential equations from geometric sequences with and without context. Supporting standards: 6.ALG.3, 6.ALG.4, 6.ALG.7, 6.ALG.8, 7.ALG.1, 7.ALG.2, 7.ALG.3, 7.NCC.9, 7.PR.6, 8.FN.6, 8.FN.7, 8.ALG.1, 8.ALG.2
A1.EFE.4	Determine the domain and range of exponential functions in mathematical problems. Supporting standards: 7.ALG.4, 8.FN.3, 8.FN.8
A1.EX.1	Add, subtract, and multiply polynomials; compare the system of polynomials to the system of integers when performing operations. Supporting standards: 6.ALG.5, 7.ALG.1, 8.NCC.3
A1.EX.4	Interpret the parts of expressions such as terms, factors, and coefficients in terms of a real-world context. Supporting standards: 5.CAR.13, 6.ALG.1, 6.ALG.2
A1.FN.4	Evaluate functions expressed in function notation for one or more elements in their domains (inputs); use function notation to describe a contextual situation. Supporting standards: 7.ALG.5, 8.FN.3
A1.QFE.2	Write quadratic equations with real number solutions that model the relationship between two quantities and produce a graph of the equation. Supporting standards: 5.GM.7, 5.GM.8, 6.GM.4, 6.ALG.1, 6.ALG.2, 6.ALG.3, 7.ALG.2, 7.ALG.4, 7.PR.6, 8.ALG.1, 8.ALG.2, 8.FN.9
A1.QFE.4	Determine the domain and range of quadratic functions in mathematical problems. Supporting standards: 7.ALG.4, 8.FN.3, 8.FN.8
A1.SP.2	Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points. Supporting standards: 6.SP.4, 6.SP.5, 6.SP.7

Table of Contents

★ 1 Foundations of Algebra 13

★ 2 Solving Linear Equations 27

★ 3 Inequalities and Absolute Value 40

★ 4 Relations, Functions, and Sequences 51

★ 5 Linear Functions and Their Graphs 81

★ 6 Systems of Equations and Inequalities 106

★ 7 Exponents, Polynomials, and Real Numbers 125

★ 8 Factoring 139

★ 9 Quadratic Functions and Equations 150

★ 10 Statistics and Probability 170

★ 11 Exponential Functions and Modeling 190

★ Prepare for the Arkansas ATLAS Algebra 1 Test 202

★ Test-Taking Strategies 205

★ Practice Test 1 208

★ Practice Test 2 224

★ Practice Test Answers and Explanations 239

★ Chapter Practices Answers and Explanations 246

1.4 Introduction to Equations and Solutions

6.ALG.8

An equation is a mathematical sentence that says two expressions are equal, and your job is to find the value that makes it true. In this section you will learn what it means for a number to be a solution of an equation, how to check a solution by plugging it back in, and how to translate everyday word problems into algebraic equations. This is where algebra starts to feel like detective work — you are finding the unknown!

Key Concepts & Quick Review

What Is an Equation? An **equation** is a mathematical sentence that uses an equals sign (=) to show that two expressions have the same value. For example, $2x + 3 = 11$ says "two times some number plus three equals eleven."

Solution of an Equation: A value that makes the equation **true** when substituted for the variable. To check, replace the variable with the value and simplify both sides. If both sides are equal, the value is a solution.

Equivalent Equations: Two equations are **equivalent** when they have exactly the same solution(s). You can produce an equivalent equation by adding or subtracting the same number on both sides, or by multiplying or dividing both sides by the same nonzero number. For example, $x + 3 = 10$ and $x = 7$ are equivalent — both are true only when $x = 7$.

Translating Words to Equations: Key phrases signal operations: "sum" or "more than" $\rightarrow +$, "difference" or "less than" $\rightarrow -$, "product" or "times" $\rightarrow \times$, "quotient" or "divided by" $\rightarrow \div$, "is" or "equals" $\rightarrow =$.

Examples

① Is $x = 5$ a solution of $3x - 7 = 8$?

Substitute 5 for x: $3(5) - 7 = 15 - 7 = 8$. The left side equals the right side ($8 = 8$), so $x = 5$ **is** a solution.

Answer: *Yes*

② Translate into an equation and check if $n = 4$: "Six more than twice a number is 14."

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"Twice a number" is $2n$; "six more than" means $+6$; "is" means $=$. Equation: $2n + 6 = 14$. Substitute $n = 4$: $2(4) + 6 = 8 + 6 = 14$. ✓Since $14 = 14$, the value $n = 4$ is a solution.

Answer: *$2n + 6 = 14$; Yes, $n = 4$ is a solution*

Practice Problems

Determine whether the given value is a solution (Yes/No), or translate the sentence into an equation. Write your answer on the line.

1. $x + 9 = 14;\ x = 5$? _____

2. $2x - 3 = 7;\ x = 5$? _____

3. $4a + 1 = 17;\ a = 3$? _____

4. $5n - 10 = 0;\ n = 2$? _____

5. $\frac{x}{3} = 6;\ x = 18$? _____

6. $3(y - 2) = 12;\ y = 6$? _____

7. "A number plus 8 is 15" → _____

8. "Three times a number is 21" → _____

9. "A number minus 4 equals 10" → _____

10. $7 - x = 3;\ x = 4$? _____

11. $2(x + 3) = 14;\ x = 4$? _____

12. "Half a number is 9" → _____

Study Tips

- To check a solution, always **substitute** the value back into the original equation and simplify both sides.
- When translating words, underline the key phrase that tells you the operation, and circle the word that means "=."
- An equation can have one solution, no solution, or many solutions. At this stage, focus on deciding whether a specific value works.

Word Problems

13. A gym membership costs a one-time sign-up fee of \$25 plus \$10 per month. After m months, the total cost is $10m + 25$. Carlos has paid \$75 so far. Write an equation and determine the number of months. _____

14. Priya says that $x = 3$ is a solution of $2x + 4 = 12$. Check whether $x = 3$ makes the equation true.

1.5 Personal Financial Literacy

6.SP.3

Algebra is not just for the classroom — it helps you make smart money decisions in real life. In this section you will learn how to calculate simple and compound interest, compare savings and loan options, and solve problems involving tax, commission, markup, and discount. You will also see how compounding works over time and why even small interest rates can make a big difference.

Key Concepts & Quick Review

Simple Interest: $I = Prt$, where P is the principal (starting amount), r is the annual interest rate (as a decimal), and t is the time in years. Total amount after t years: $A = P + Prt = P(1 + rt)$.

Compound Interest: $A = P\left(1 + \frac{r}{n}\right)^{nt}$, where n is the number of times interest is compounded per year. When compounded annually, $n = 1$.

Percent Applications: Discount: Sale Price = Original − Original × discount rate. Tax: Total = Price + Price × tax rate. Commission: Earnings = sales × commission rate.

Examples

① You deposit \$500 in an account that earns 4% simple interest per year. How much interest do you earn in 3 years? What is the total amount?

Use $I = Prt$: $I = 500 \times 0.04 \times 3 = 60$. Total amount $A = 500 + 60 = 560$.

Answer: *Interest* = \$60; *Total* = \$560

② You invest \$1,000 at 5% interest compounded annually. What is the balance after 2 years?

Use $A = P(1 + r)^t$ with $P = 1000$, $r = 0.05$, $t = 2$: $A = 1000(1.05)^2 = 1000(1.1025) = 1102.50$.

Answer: \$1,102.50

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