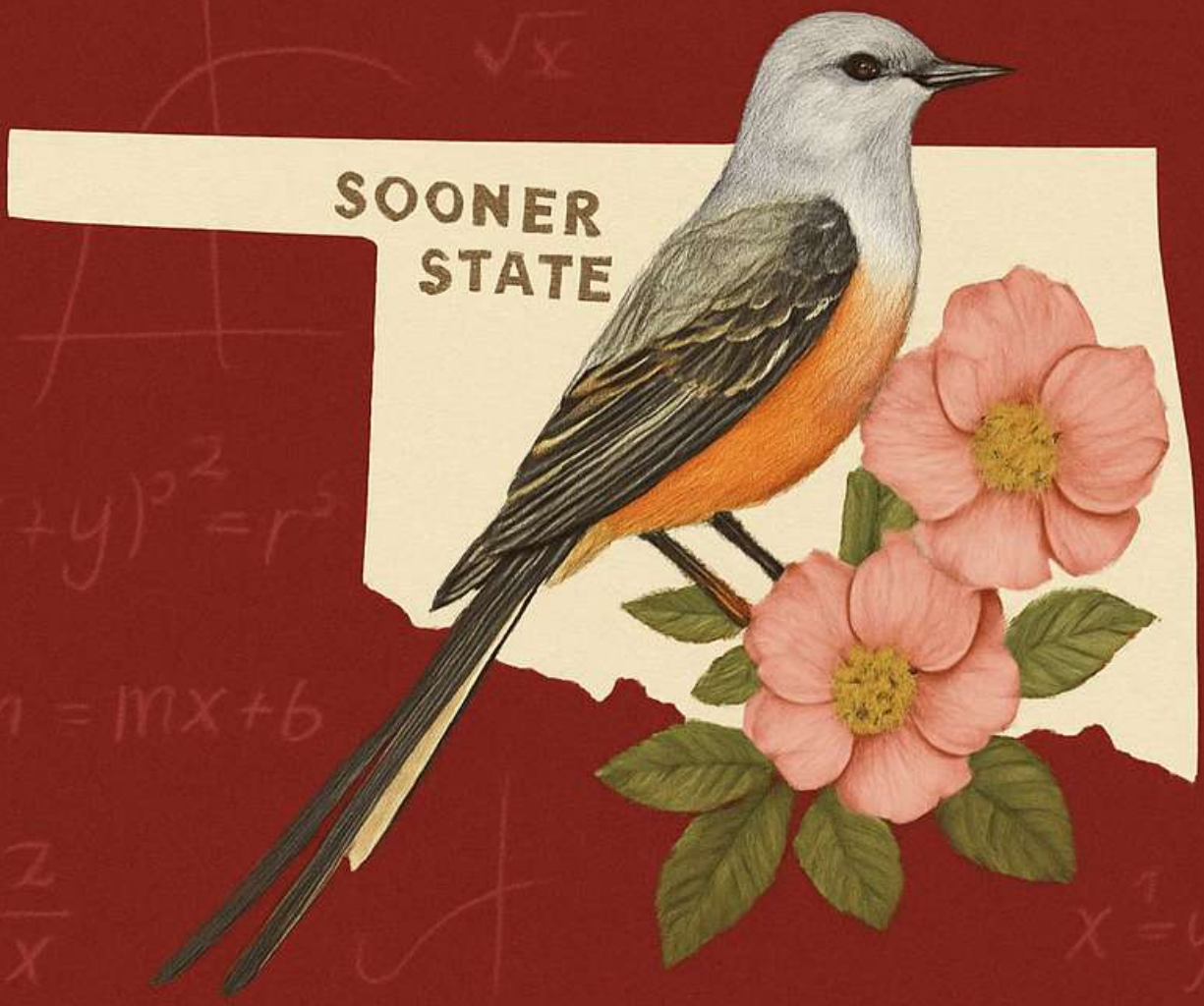
OKLAHOMA OSTP



ALGEBRA I WORKBOOK

PRACTICE PROBLEMS TO MASTER ALGEBRA I

$y = mx + b$

$a^2 + b^2 = c^2$

WORKBOOK

Oklahoma OSTP

Algebra I Workbook

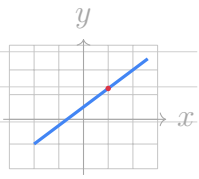
Comprehensive Practice, Challenging Exercises, and

Strategic Guidance for Complete Test-Day Confidence

- ☐ Topic practice with room to work, check, and correct mistakes.
- ☐ Mixed review that keeps earlier Algebra I skills active.
- ☐ Practice tests and explanations for final readiness.

Skill Check

1. Solve: $2x + 5 = 17$
2. Factor: $x^2 - 9$
3. Interpret the slope.



$f(x)$

Reza Nazari

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Oklahoma Algebra I Standards

Every topic in this book is built around the official Oklahoma Algebra I standards. The list below shows the standards used by the topics in this book. Codes are kept in the state reference format, so each state keeps its own code style instead of a generic numbered list.

Use this page as a map while you study. Every code listed here appears beside at least one topic heading, and some topics naturally connect to two or three standards.

How to use this list:

- **Before you start** — skim the standards to see the big picture of what Algebra I covers.
- **As you study** — connect the code beside a topic to the skill it strengthens.
- **Before the test** — use the list as a final checklist for your review.

A1.A

This section pulls together the core language of Algebra I: expressions, equations, inequalities, functions, and the structure that makes algebra useful.

A1.A.1 Represent and solve mathematical and real-world problems using linear equations, absolute value equations, and systems of equations; interpret solutions in the original context.

A1.A.2 Represent and solve real-world and mathematical problems using linear inequalities and compound inequalities; interpret solutions in the original context.

A1.A.3 Create and evaluate equivalent algebraic expressions and equations using algebraic properties.

A1.A.4 Analyze real-world and mathematical problems involving linear equations.

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A1.A.1

This section pulls together the core language of Algebra I: expressions, equations, inequalities, functions, and the structure that makes algebra useful.

A1.A.1.1 Use knowledge of solving equations with rational values to represent, use and apply mathematical models (e.g., angle measures, geometric formulas, dimensional analysis, Pythagorean theorem, science, statistics) and interpret the solutions in the original context.

A1.A.1.2 Solve absolute value equations and interpret the solutions in the original context.

A1.A.1.3 Analyze, use and apply mathematical models to solve problems involving systems of linear equations with a maximum of two variables by graphing, substitution, and elimination. Graphing calculators or other appropriate technology may be utilized. Interpret the solutions in the original context.

A1.A.2

This section pulls together the core language of Algebra I: expressions, equations, inequalities, functions, and the structure that makes algebra useful.

A1.A.2.1 Represent relationships using mathematical models with linear inequalities; solve the resulting inequalities, graph on a coordinate plane, and interpret the solutions.

A1.A.2.2 Represent relationships using mathematical models with compound and absolute value inequalities and solve the resulting inequalities by graphing and interpreting the solutions on a number line.

A1.A.3

This section pulls together the core language of Algebra I: expressions, equations, inequalities, functions, and the structure that makes algebra useful.

A1.A.3.1 Solve equations involving several variables for one variable in terms of the others.

A1.A.3.2 Simplify polynomial expressions by adding, subtracting, or multiplying.

A1.A.3.3 Factor common monomial factors from polynomial expressions and factor quadratic expressions with a leading coefficient of 1.

A1.A.3.4 Evaluate linear, absolute value, rational, and radical expressions. Include applying a nonstandard operation such as $x \odot y = 2x + y$.

A1.A.4

This section pulls together the core language of Algebra I: expressions, equations, inequalities, functions, and the structure that makes algebra useful.

A1.A.4.1 Analyze, use and apply mathematical models and other data sets (e.g., graphs, equations, two points, a set of data points) to calculate and interpret slope and the x- and y-intercepts of a line.

A1.A.4.3 Write the equation of the line given its slope and y-intercept, slope and one point, two points, x- and y-intercepts, or a set of data points.

A1.A.4.4 Express linear equations in slope-intercept, point-slope, and standard forms. Convert between these forms.

A1.D

This section gathers related Algebra I skills. The individual expectations below show the exact reasoning, modeling, and problem-solving work students will practice.

A1.D.1 Display, describe, and compare data. For linear relationships, make predictions, and assess the reliability of those predictions.

A1.D.2 Calculate probabilities, and apply probability concepts.

A1.D.1

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1.3 Simplifying Algebraic Expressions

A1.D.2.3

Quick Review and Helpful Hints

Like Terms: Terms that have the *same* variable(s) raised to the *same* power. For example, $5x$ and $-3x$ are like terms; $5x$ and $5x^2$ are **not**. To combine like terms, add or subtract their coefficients: $5x + (-3x) = 2x$.

Distributive Property: $a(b + c) = ab + ac$. Use it to remove parentheses, then combine any like terms.

Simplification Strategy: **Step 1** — Distribute to clear all parentheses. **Step 2** — Group like terms together. **Step 3** — Combine the coefficients.

Example: Simplify $3(2x + 4) - 5x + 7$.

Distribute the 3: $6x + 12 - 5x + 7$. Combine the x-terms: $6x - 5x = x$. Combine the constants: $12 + 7 = 19$. The simplified expression is $x + 19$.

Answer: $x + 19$

Practice Problems

Simplify each expression.

1. $5x + 3x =$ _____
2. $7a - 2a + 4 =$ _____
3. $2(x + 6) =$ _____
4. $-3(2y - 5) =$ _____
5. $4m + 3 - 2m + 1 =$ _____
6. $6(n + 2) - 4n =$ _____
7. $3(x - 4) + 2(x + 1) =$ _____
8. $-5(2p + 3) + 8p =$ _____
9. $7 - 3(k - 2) =$ _____
10. $2(a + b) + 3(a - b) =$ _____
11. $\frac{1}{2}(4x + 8) =$ _____
12. $-4(x - 3) + 4x =$ _____

Scan Me

Word Problems

13. A rectangular garden has a length of $(3x + 2)$ feet and a width of $(x + 4)$ feet. Write and simplify an expression for the perimeter. _____

14. Mia buys 3 notebooks at $(n + 1)$ dollars each and 2 pens at $(n - 2)$ dollars each. Write and simplify an expression for her total cost. _____

1.4 Introduction to Equations and Solutions

A1.A.1.1 A1.A.1.2

Quick Review and Helpful Hints

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.

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" $\rightarrow =$.

Example: 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

Practice Problems

Determine whether the given value is a solution (Yes/No), or translate and solve.

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"

Equation: _____

Scan Me

8. "Three times a number is 21"

Equation: _____

9. "A number minus 4 equals 10"

Equation: _____

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

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

12. "Half a number is 9"

Equation: _____

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.

_____