OKLAHOMA OSTP



ALGEBRA I

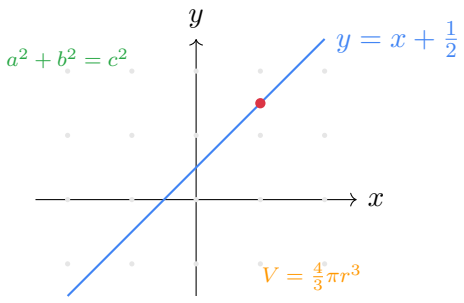
MADE RIDICULOUSLY SIMPLE

THE ULTIMATE STUDY GUIDE TO ACE ALGEBRA I

Oklahoma OSTP Algebra I

Made Ridiculously Simple

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



Reza Nazari

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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 y = 2x + y.
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.1.3	Make predictions based upon the linear regression, and use the correlation coefficient to assess the reliability of those predictions using graphing technology.
A1.D.2.2	Given a Venn diagram, determine the probability of the union of events, the intersection of events, and the complement of an event. Understand the relationships between these concepts and the words "AND," "OR," and "NOT."
A1.D.2.3	Use simulations and experiments to calculate experimental probabilities.
A1.D.2.4	Apply probability concepts to real-world situations to make informed decisions.
A1.F.1.1	Distinguish between relations and functions.
A1.F.1.2	Identify the dependent variable, independent variable, domain and range given a function, equation, or graph. Identify restrictions on the domain and range in mathematical models.
A1.F.1.4	Read and interpret the linear piecewise function, given a graph modeling a situation.
A1.F.2.1	Distinguish between linear and nonlinear (including exponential) functions. Understand that linear functions grow by equal intervals (arithmetic) and that exponential functions grow by equal factors over equal intervals (geometric).
A1.F.2.2	Recognize the parent functions f(x) = x and f(x) = |x|. Predict the effects of vertical and horizontal transformations f(x + c) and f(x) + c, algebraically and graphically.
A1.F.3.2	Use function notation; evaluate a function, including nonlinear, at a given point in its domain algebraically and graphically. Interpret the results in terms of the original context.

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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. _____

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

Chapter 1 Answer Key

Foundations of Algebra

Variables, Expressions, and Properties

1) $3x + 12$
2) $10a - 2$
3) Commutative Property (of Addition)
4) Associative Property (of Multiplication)
5) $12n + 18$
6) $6x - 12$
7) $5m$ (Identity Property of Addition)
8) Associative Property (of Addition)
9) $9a - 43$
10) $-7x - 8$
11) $7x - 2$
12) 1 (Multiplicative Inverse)
13) $4d - 6$ dollars
14) No, they are not equivalent

Order of Operations and Evaluating Expressions

1) 14
2) 22
3) 18
4) 12
5) 8
6) 2
7) 5
8) 20
9) 11
10) 5
11) $\frac{5}{2}$
12) 7
13) \$31
14) \$225

Simplifying Algebraic Expressions

1) $8x$
2) $5a + 4$
3) $2x + 12$
4) $-6y + 15$
5) $2m + 4$
6) $2n + 12$
7) $5x - 10$
8) $-2p - 15$
9) $-3k + 13$ (or $13 - 3k$)
10) $5a - b$
11) $2x + 4$
12) 12
13) $8x + 12$ feet
14) $5n - 1$ dollars

Introduction to Equations and Solutions

1) Yes $(5 + 9 = 14 \checkmark)$
2) Yes $(10 - 3 = 7 \checkmark)$
3) No $(4(3) + 1 = 13 \neq 17)$
4) Yes $(5(2) - 10 = 0 \checkmark)$
5) Yes $(18 \div 3 = 6 \checkmark)$
6) Yes $(3(6 - 2) = 12 \checkmark)$
7) $n + 8 = 15$
8) $3n = 21$
9) $n - 4 = 10$
10) Yes $(7 - 4 = 3 \checkmark)$
11) Yes $(2(7) = 14 \checkmark)$
12) $\frac{n}{2} = 9$
13) $m = 5$ months
14) No, $x = 3$ is not a solution

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