NORTH CAROLINA



ALGEBRA I

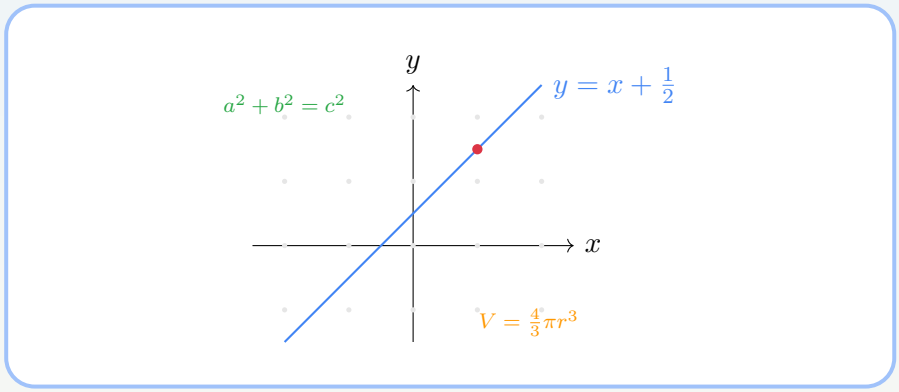
MADE RIDICULUOSLY SIMPLE

THE ULTIMATE STUDY GUIDE TO ACE ALGEBRA I

North Carolina Algebra I

Made Ridiculously Simple

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



Reza Nazari

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1.03.c	Create and use simulations for probability models.
1.03.d	Find expected values and determine fairness.
1.03.e	Identify and use discrete random variables to solve problems.
2.01.a	Solve using tables, graphs, and algebraic properties.
2.02.a	Solve using tables, graphs, and algebraic properties.
2.03.a	Solve using tables, graphs, and algebraic properties.
2.05.a	Find the sum of a finite sequence.
2.05.b	Find the sum of an infinite sequence.

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CHAPTER

1

Foundations of Algebra

1 Variables, Expressions, and Properties 1.02.a 1.02.e

2 Order of Operations and Evaluating Expressions 1.02.c 1.03.e

3 Simplifying Algebraic Expressions 1.02.c 1.03.e

4 Introduction to Equations and Solutions 1.03.c 1.03.e

5 Personal Financial Literacy 1.01.b 1.02.a 1.02.c

"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.

_____

1.5 Personal Financial Literacy

1.01.b | 1.02.a | 1.02.c

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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✎ Practice Problems

Solve each problem. Round to the nearest cent when needed. Write your answer on the line.

1. $I = Prt$; $P = \$200$, $r = 3\%$, $t = 4$ yr; find I _____

2. $I = Prt$; $P = \$800$, $r = 5\%$, $t = 2$ yr; find I _____

3. $A = P(1 + r)^t$; $P = \$600$, $r = 6\%$, $t = 1$; find A _____

4. $A = P(1+r)^t$; $P = \$1000$, $r = 4\%$, $t = 3$; find A _____

5. Original price \$80; 25% discount. Find the sale price. _____

6. Price \$45; 8% tax. Find the total. _____

7. Sales \$3000; 6% commission. Find the commission. _____

8. Original price \$120; 15% markup. Find the new price. _____

9. $I = Prt$; $P = \$500$, $r = 7\%$, $t = 5$ yr; find A. _____

10. $A = P(1 + r)^t$; $P = \$2000$, $r = 3\%$, $t = 2$; find A _____

11. Price \$60; 20% off, then 7% tax. Find the total. _____

12. Compare simple and compound interest on \$1000 at 5% for 3 yr. Find the difference. _____

Study Tips

- ☞ Always convert percent to a decimal **before** plugging into a formula: $5\% = 0.05$, not 5.
- ☞ Compound interest grows faster than simple interest because each period you earn interest *on your interest*.
- ☞ For discount-then-tax problems, calculate the discount first, then apply tax to the sale price, not the original price.

✍ Word Problems

13. Aisha deposits \$1,200 in a savings account that pays 3.5% simple interest per year. She wants to save for 4 years. How much will she have in the account at the end of 4 years?

_____

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