

Simplifying Algebraic Expressions

Algebra 1 • Section 1.3

Name: _____

Date: _____

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Quick Review and Helpful Hints

Algebra becomes easier when every symbol has a job. Read the operation first, keep signs attached to their terms, and check that each step still means the same thing as the original expression.

▷ **Example:** Simplify $2(x + 6) + 3x$.

Work: Distribute first: $2(x + 6) = 2x + 12$. Then combine like terms: $2x + 12 + 3x = 5x + 12$.

★ **Answer:** $5x + 12$

◆ Practice Problems

Solve each problem. Show enough work that another student could follow your thinking.

1. Simplify $6x + 4x$. _____

6. Simplify $5(2p + 1) - 3(p - 4)$. _____

2. Simplify $8a - 3a + 5$. _____

7. Simplify $\frac{1}{2}(8n - 6)$. _____

3. Simplify $4(y + 3)$. _____

8. Simplify $7 - 4(k - 2)$. _____

4. Simplify $-2(5m - 7)$. _____

9. Simplify $2(a + 3b) - 5(a - b)$. _____

5. Simplify $3(x - 4) + 2x$. _____

10. Simplify $9q - 3(2q + 5)$. _____

◆ Word Problems

11. The sides of a triangle are $x + 2$, $2x - 1$, and $3x + 5$. Find the perimeter expression. _____

12. A store sells 4 packs of markers at m dollars each and gives a \$6 coupon. Write the simplified cost. _____



Answer Keys

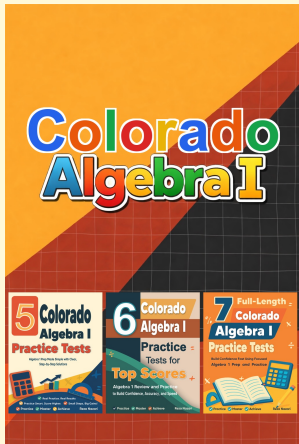
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|----------------|----------------|
| 1. $10x$ | 7. $4n - 3$ |
| 2. $5a + 5$ | 8. $15 - 4k$ |
| 3. $4y + 12$ | 9. $-3a + 11b$ |
| 4. $-10m + 14$ | 10. $3q - 15$ |
| 5. $5x - 12$ | 11. $6x + 6$ |
| 6. $7p + 17$ | 12. $4m - 6$ |

Step-by-Step Explanations

- Think of these as 6 x 's and 4 more x 's sitting together — counting them up just gives you $10x$.
- Only matching pieces can combine: the a -terms shrink to $5a$, but the lonely 5 has no partner, so it rides along untouched.
- The 4 has to reach every term inside, not just the first one. So it touches y and the 3, giving $4y + 12$.
- Send the -2 to both terms and mind the signs: $-2 \cdot 5m = -10m$, and two negatives in $-2 \cdot (-7)$ flip up to $+14$.
- Spread the 3 first to get $3x - 12$, then let the x -terms find each other: $3x + 2x = 5x$, leaving $5x - 12$.
- Open both sets of parentheses — watch that -3 flip the -4 to $+12$ — then gather: $10p - 3p = 7p$ and $5 + 12 = 17$.
- Multiplying by $\frac{1}{2}$ is just splitting each term in half: half of $8n$ is $4n$, and half of 6 is 3.
- That -4 in front belongs to both inside terms, so $-4(-2)$ becomes $+8$. Then $7 + 8 = 15$, and the answer is $15 - 4k$.
- Distribute carefully and you get $2a + 6b - 5a + 5b$. Sort by letter: $2a - 5a = -3a$ and $6b + 5b = 11b$.
- Hand off the -3 first: $9q - 6q - 15$. The q -terms collapse to $3q$, and the -15 stands alone.
- Perimeter means add up all three sides. Stack the x -terms ($x + 2x + 3x = 6x$) and the numbers ($2 - 1 + 5 = 6$) separately.
- Four packs at m dollars each is $4m$. A coupon takes money off, so subtract: $4m - 6$.



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