Expanding Expressions with the Distributive Property

Spot mistakes, reason, and work backward

Name _____ **Date** _____ **Score** _____ / 10

QUICK REVIEW

Distribute the outside factor to every term: $a(b+c) = ab + ac$. For example, $-3(2x-5) = -6x+15$; the two negative factors in the constant product make a positive result.

Worked example

Example: simplify $7(4x-3)$.

1. Multiply the variable term: $7(4x) = 28x$.
2. Multiply the constant too: $7(-3) = -21$.
3. Combine the two products: $28x - 21$.

Answer: $28x - 21$.

Practice Problems

Show your thinking.

1. Sign repair: a student claims $2(3x+5) = 6x+11$. Correct the constant term and verify at $x = 2$.

2. Recover coefficients: an equivalent form of $3(2x+5)$ has coefficient q on x and constant r. Find (q, r) and then write the resulting expression.

3. Calculator audit: a calculator reports 4 for $4(-x+3)$ when $x = 2$. Verify by rewriting first; report any error.

4. Rebuild the form: $5(3x-2) = 15x+k$. Find k, then write the simplified expression.

5. Explain equivalence: decide whether $2(5x+3)$ and $10x+6$ are equivalent for every x. Give algebra and a numerical check.

6. Evaluation: rewrite $3(4x-1)$, then evaluate the rewritten expression at $x = 2$.

7. Locker-code rule: a student claims $3(4x-5) = 12x-14$. Correct the constant term and verify at $x = 2$.

8. Token-count rule: an equivalent form of $-2(3x+4)$ has coefficient q on x and constant r. Find (q, r) and then write the resulting expression.

9. Tile-pack rule: a calculator reports 5 for $5(2x-3)$ when $x = 2$. Verify by rewriting first; report any error.

10. Meter-offset rule: $4(5x-7) = 20x+k$. Find k, then write the simplified expression.

Answer Key

1. Correct form $6x + 10$; correct value 22, not 23.
2. $(q, r) = (6, 15)$; $6x + 15$.
3. No error; $-4x + 12$ evaluates to 4.
4. $k = -10$; $15x - 10$.
5. Yes; they are equivalent.
6. $12x - 3$; value 21.
7. Correct form $12x - 15$; correct value 9, not 10.
8. $(q, r) = (-6, -8)$; $-6x - 8$.
9. No error; $10x - 15$ evaluates to 5.
10. $k = -28$; $20x - 28$.

Step-by-Step Solutions

Follow each calculation, then check your own work.

Problem 1

1. Multiply the variable term: $2(3x) = 6x$.
2. Multiply the constant too: $2(5) = 10$.
3. Combine the two products: $6x + 10$.
4. At $x = 2$, the correct value is $6(2) + (10) = 22$; the claim gives 23.

Problem 2

1. Multiply the variable term: $3(2x) = 6x$.
2. Multiply the constant too: $3(5) = 15$.
3. Combine the two products: $6x + 15$.

Problem 3

1. Multiply the variable term: $4(-1x) = -4x$.
2. Multiply the constant too: $4(3) = 12$.
3. Combine the two products: $-4x + 12$.
4. Check: $-4(2) + (12) = 4$.

Problem 4

1. Multiply the variable term: $5(3x) = 15x$.
2. Multiply the constant too: $5(-2) = -10$.
3. Combine the two products: $15x - 10$.
4. The variable terms match, so the missing constant is $k = -10$.

Problem 5

1. Multiply the variable term: $2(5x) = 10x$.
2. Multiply the constant too: $2(3) = 6$.
3. Combine the two products: $10x + 6$.
4. Numerical check at $x = 2$: both equal $10(2) + (6) = 26$.

Problem 6

1. Multiply the variable term: $3(4x) = 12x$.
2. Multiply the constant too: $3(-1) = -3$.
3. Combine the two products: $12x - 3$.
4. At $x = 2$: $12(2) + (-3) = 21$.

Problem 7

1. Multiply the variable term: $3(4x) = 12x$.
2. Multiply the constant too: $3(-5) = -15$.
3. Combine the two products: $12x - 15$.
4. At $x = 2$, the correct value is $12(2) + (-15) = 9$; the claim gives 10.

Problem 8

1. Multiply the variable term: $-2(3x) = -6x$.
2. Multiply the constant too: $-2(4) = -8$.
3. Combine the two products: $-6x - 8$.

Problem 9

1. Multiply the variable term: $5(2x) = 10x$.
2. Multiply the constant too: $5(-3) = -15$.
3. Combine the two products: $10x - 15$.
4. Check: $10(2) + (-15) = 5$.

Problem 10

1. Multiply the variable term: $4(5x) = 20x$.
2. Multiply the constant too: $4(-7) = -28$.
3. Combine the two products: $20x - 28$.
4. The variable terms match, so the missing constant is $k = -28$.

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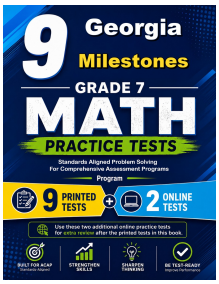

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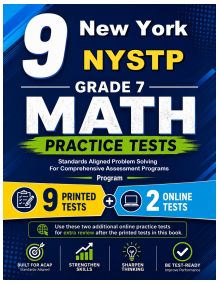

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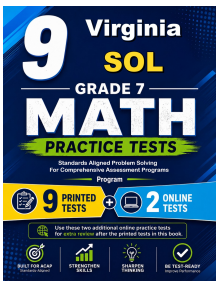

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