Expanding Expressions with the Distributive Property

Explore ideas and representations

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. Algebra tiles: simplify $2(3x+5)$.

2. Substitution table: rewrite $3(2x+5)$, then evaluate the rewritten expression at $x = 2$.

3. Missing constant: $4(-x+3) = -4x + k$. Find k, then write the simplified expression.

4. Identity test: decide whether $5(3x-2)$ and $15x - 10$ are equivalent for every x. Give algebra and a numerical check.

5. Check a claim: a student claims $2(5x+3) = 10x + 7$. Correct the constant term and verify at $x = 2$.

6. Workshop cost: a cost in dollars is modeled by $3(4x-1)$. Rewrite it to expose its coefficient and fixed amount, then find the cost at $x = 2$.

7. Locker-code rule: simplify $3(4x-5)$.

8. Token-count rule: rewrite $-2(3x+4)$, then evaluate the rewritten expression at $x = 2$.

9. Tile-pack rule: $5(2x-3) = 10x + k$. Find k, then write the simplified expression.

10. Meter-offset rule: decide whether $4(5x-7)$ and $20x - 28$ are equivalent for every x. Give algebra and a numerical check.

Answer Key

1. $6x + 10$.
2. $6x + 15$; value 27.
3. $k = 12$; $-4x + 12$.
4. Yes; they are equivalent.
5. Correct form $10x + 6$; correct value 26, not 27.
6. $12x - 3$; cost \$21.00.
7. $12x - 15$.
8. $-6x - 8$; value -20.
9. $k = -15$; $10x - 15$.
10. Yes; they are equivalent.

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: $6x + 10$.

Problem 2

1. Multiply the variable term: $3(2x) = 6x$.
2. Multiply the constant too: $3(5) = 15$.
3. Combine the two products: $6x + 15$.
4. At $x = 2$: $6(2) + (15) = 27$.

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. The variable terms match, so the missing constant is $k = 12$.

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. Numerical check at $x = 2$: both equal $15(2) + (-10) = 20$.

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. At $x = 2$, the correct value is $10(2) + (6) = 26$; the claim gives 27.

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. The cost at $x = 2$ is $12(2) + (-3) = 21$ dollars.

Problem 7

1. Multiply the variable term: $3(4x) = 12x$.
2. Multiply the constant too: $3(-5) = -15$.
3. Combine the two products: $12x - 15$.

Problem 8

1. Multiply the variable term: $-2(3x) = -6x$.
2. Multiply the constant too: $-2(4) = -8$.
3. Combine the two products: $-6x - 8$.
4. At $x = 2$: $-6(2) + (-8) = -20$.

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. The variable terms match, so the missing constant is $k = -15$.

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. Numerical check at $x = 2$: both equal $20(2) + (-28) = 12$.

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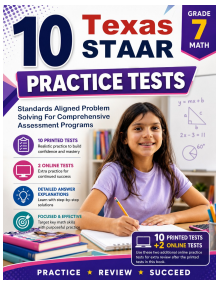

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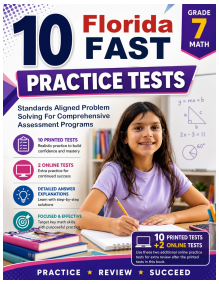

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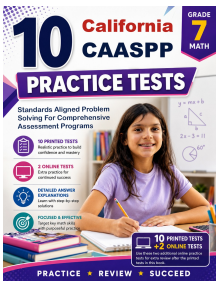

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