The Distributive Property with Common Factors

Distributive property with common factors: Applications and decisions

Name _____ **Date** _____ **Score** _____ / 8

QUICK REVIEW

Distribute $a(b+c) = ab + ac$; reverse by factoring a common factor. Since GCF$(18, 30) = 6$, $18 + 30 = 6(3 + 5) = 48$. For subtraction, $28 - 12 = 4(7 - 3) = 16$. A factored expression must reproduce both terms.

Worked example

Factor $24 + 40$ using the GCF, then evaluate.

1. The GCF is 8: $24/8 = 3$ and $40/8 = 5$.
2. Factor and compute: $8(3 + 5) = 8 \times 8 = 64$.
3. Expanding returns $8 \times 3 + 8 \times 5 = 24 + 40$.
Answer: $24 + 40 = 8(3 + 5) = 64$.

Practice Problems

Show your thinking.

1. Two rectangular gardens have common width 12 m and areas $24, 36$ square m. Combine their lengths and find total area.

2. A club sells 45 morning and 30 afternoon tickets. Factor the total using 5, then using the GCF. Which has smaller counts inside the parentheses?

3. A 72-square-m board loses 24 square m. Factor with GCF to find remaining area.

4. Make groups of exactly 7 from 28 red and 42 blue flags, with one color per group. How many groups of each color? Write the factored total.

5. A supply of 60 notebooks loses 36. Use a common factor to compute the remaining number.

6. A diagram label says $8(5 + 56)$ for areas 40 and 56. Correct the factored total.

7. A club collects 54 cans and later 72 cans. Pack each collection separately into same-size batches with no cans left. Find the greatest possible batch size and write the factored total.

8. Explain a common-factor shortcut for using 30 items from a supply of 90.

Answer Key

1. Joined length 5 m; total area 60 square meters.
2. $5(9+6) = 15(3+2) = 75$ tickets. The GCF version has smaller counts.
3. $24(3-1) = 48$ square meters remain.
4. 4 red groups and 6 blue groups; $7(4+6) = 70$ flags.
5. $12(5-3) = 24$ notebooks remain.
6. $8(5+7) = 96$ square units.
7. 18 cans per batch; $18(3+4) = 126$ cans.
8. $30(3-1) = 60$ items remain.

Step-by-Step Solutions

Follow each calculation, then check your own work.

Problem 1

1. Divide each area by the common 12-m width: $24/12 = 2$ m and $36/12 = 3$ m.
2. The combined length is $2+3 = 5$ m.
3. Total area $= 12(2+3) = 12(5) = 60$ square meters.

Problem 2

1. Using 5, divide the two counts: $45/5 = 9$ and $30/5 = 6$, giving $5(9+6)$.
2. The GCF is 15, so $45/15 = 3$ and $30/15 = 2$ give $15(3+2)$.
3. The counts $3, 2$ are smaller than $9, 6$, and both expressions equal 75 tickets.

Problem 3

1. The GCF is 24: $72/24 = 3$ and $24/24 = 1$.
2. Factor and compute: $24(3-1) = 24 \times 2 = 48$.
3. Expanding returns $24 \times 3 - 24 \times 1 = 72 - 24$.

Problem 4

1. Red groups: $28/7 = 4$. Blue groups: $42/7 = 6$.
2. There are $4+6 = 10$ groups of 7, so $7(4+6) = 70$ flags.

Problem 5

1. The GCF is 12: $60/12 = 5$ and $36/12 = 3$.
2. Factor and compute: $12(5-3) = 12 \times 2 = 24$.
3. Expanding returns $12 \times 5 - 12 \times 3 = 60 - 36$.

Problem 6

1. The GCF is 8: $40/8 = 5$ and $56/8 = 7$.
2. Factor and compute: $8(5+7) = 8 \times 12 = 96$.
3. Expanding returns $8 \times 5 + 8 \times 7 = 40 + 56$.

Problem 7

1. The GCF is 18: $54/18 = 3$ and $72/18 = 4$.
2. Factor and compute: $18(3+4) = 18 \times 7 = 126$.
3. The greatest shared batch size is 18, so $3+4 = 7$ batches give 126 cans.

Problem 8

1. The GCF is 30: $90/30 = 3$ and $30/30 = 1$.
2. Factor and compute: $30(3-1) = 30 \times 2 = 60$.
3. Expanding returns $30 \times 3 - 30 \times 1 = 90 - 30$.

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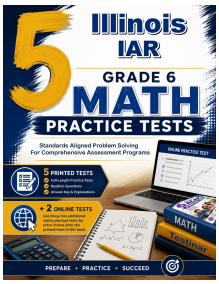

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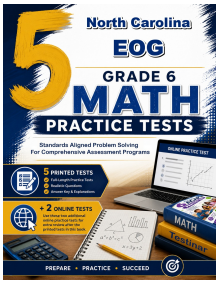

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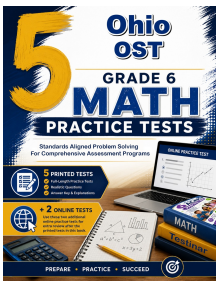

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