Expressions Example

An algebraic expression combines numbers, variables, and operations without an equals sign. Simplifying rewrites it in an equivalent, more concise form. The distributive property preserves value when a factor outside parentheses multiplies every term inside; like terms can then be combined because they represent the same variable quantity. Algebraic notation developed across many cultures over centuries, so there is no single inventor. This example demonstrates both rules and verifies the result with a test value.

Worked example

Simplify 3(2x + 4) − x.

FORMULA / RULE USED

Distributive property: a(b + c) = ab + ac; combine like terms by adding their coefficients.

Step-by-step solution

STEP 1 · Distribute the 3

Multiply 3 by each term inside the parentheses, not just the first term.

$$3(2x + 4) - x = 3(2x) + 3(4) - x$$

STEP 2 · Evaluate the products

Multiply the numerical coefficients and constant.

$$6x + 12 - x$$

STEP 3 · Combine like terms

The x-terms have coefficients 6 and −1. Keep the constant separate.

$$6x - x = (6 - 1)x = 5x; \text{ therefore } 5x + 12$$

Answer

ANSWER

The simplified expression is 5x + 12.

Check

Set x = 2. Both the original expression and the simplified expression equal 22.

$$3(2(2) + 4) - 2 = 22; 5(2) + 12 = 22$$