

Grade 6 · Writing and Evaluating Algebraic Expressions · Lesson

Common Core 6.EE.A.2, 6.EE.A.3, 6.EE.A.4 · mathovore.fr

An algebraic expression combines numbers, variables, and operations, such as $3n+5$. A variable is a letter that stands for a number. To evaluate an expression, substitute a value for the variable and follow the order of operations. Equivalent expressions, like $2(x+3)$ and $2x+6$, have the same value for every x .

Grade 6 Common Core: 6.EE.A.2 · 6.EE.A.3 · 6.EE.A.4

Key facts:

- In $7x+2$, the terms are $7x$ and 2 , the coefficient is 7 , and the constant is 2 .
- Key words: sum means add, difference means subtract, product means multiply, quotient means divide.
- For a cube with edge s , volume is $V = s^3$ and surface area is $A = 6s^2$.
- The distributive property says $a(b+c) = ab+ac$, and like terms combine: $5x+2x = 7x$.

What is an algebraic expression?

An algebraic expression is a mathematical phrase made of numbers, variables, and operation symbols, such as $3n+5$. A **variable** is a letter that stands for a number that can change. Expressions have no equals sign, so they cannot be "solved," only simplified or evaluated.

Parts of an expression

In $3n+5$, there are two **terms**: $3n$ and 5 . The number multiplying the variable, 3 , is the **coefficient**. The term 5 has no variable and is a **constant**. In $3n$, the numbers and letters multiplied together, 3 and n , are **factors**.



Parts of $3n+5$: two terms, $3n$ and 5 .

How do you write an expression from words?

Match key words to operations: sum means add, difference means subtract, product means multiply, and quotient means divide.

Words	Expression
8 more than n	$n+8$
8 less than n	$n-8$
the product of 4 and n	$4n$
n divided by 3	$\frac{n}{3}$
twice the sum of n and 3	$2(n+3)$

Key word	Operation
sum	+
difference	-
product	$\times$
quotient	$\div$

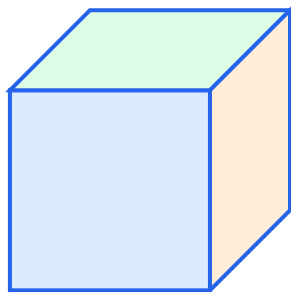
Key words and their operations.

How do you evaluate an expression?

To **evaluate**, replace each variable with its given value and follow the order of operations.

Example: evaluate $3x^2-4$ when $x=5$. Substitute: $3 \times 5^2 - 4$. Exponent: $3 \times 25 - 4$. Multiply: $75 - 4$. Subtract: 71.

Formulas are expressions too. A cube with edge length s has volume $V = s^3$ and surface area $A = 6s^2$. For $s = 4$ in: $V = 4^3 = 64$ in³ and $A = 6 \times 16 = 96$ in².



all edges equal

edge s

Cube: $V = s^3$ and $A = 6s^2$.

What are equivalent expressions?

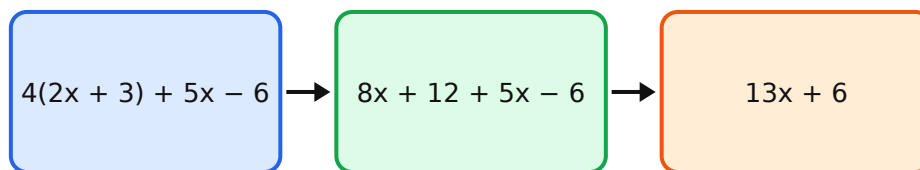
Equivalent expressions have the same value for every value of the variable. Two tools create them.

- **Distributive property:** $a(b+c) = ab+ac$, so $3(x+4) = 3x+12$.
- **Combining like terms:** terms with the same variable part can be added, so $5x+2x = 7x$.

Example: simplify $4(2x+3)+5x-6$.

1. Distribute: $8x+12+5x-6$.
2. Group like terms: $(8x+5x)+(12-6)$.
3. Combine: $13x+6$.

Check by substituting $x=2$: the original gives $4(7)+10-6=32$, and $13(2)+6=32$. They match.



Distribute, then combine like terms.

Writing and Evaluating Algebraic Expressions: frequently asked questions

What is the difference between an expression and an equation?

An equation has an equals sign and states that two quantities are equal, like $x+3=9$. An expression, like $x+3$, has no equals sign and is only a phrase that can be evaluated or simplified.

What is a coefficient?

A coefficient is the number multiplied by a variable. In $8y+5$, the coefficient of y is 8. If a variable has no number written in front, such as m , its coefficient is 1.

How do you evaluate an expression?

Substitute the given number for each variable, then follow the order of operations. For $2n+7$ when $n=5$, compute $2 \times 5 + 7 = 17$.

What are like terms?

Like terms have the same variable part, so only their coefficients differ. For example, $6a$ and $2a$ are like terms and combine to $8a$, but $6a$ and 2 are not like terms.

How can you check that two expressions are equivalent?

Substitute the same value into both and compare. If $3(x+4)$ and $3x+12$ both equal 21 when $x=3$, that supports equivalence. One mismatch, however, proves they are not equivalent.