

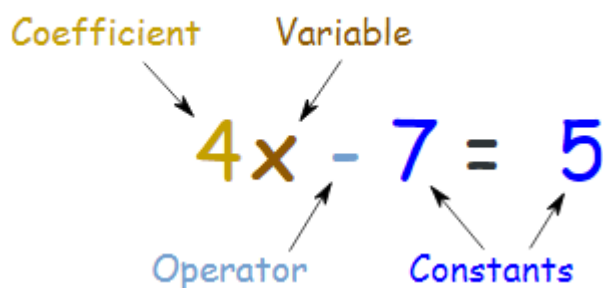
Algebraic Expressions

What is an Algebraic Expression?

Algebraic Expression Definition: An algebraic expression in mathematics is an expression which is made up of variables and constants along with algebraic operations (addition, subtraction, etc.) Expressions are made up of terms.

Example of algebraic expression:

$3x+4y -7$, $4x - 10$ etc.



A **Variable** is a symbol for a number we don't know yet. It is usually a letter like x or y.

A number on its own is called a **Constant**.

A **Coefficient** is a number used to multiply a variable ($4x$ means **4** times **x**, so **4** is a coefficient)

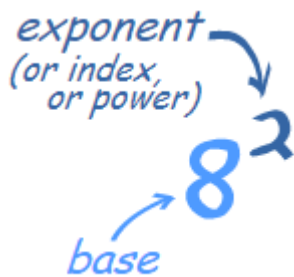
Variables on their own (without a number next to them) actually have a coefficient of 1 (**x** is really **1x**)

Sometimes a coefficient is a letter like **a** or **b** instead of a number:

Example: $ax^2 + bx + c$

- **x** is a variable
- **a** and **b** are coefficients
- **c** is a constant

The exponent of a number says how many times to use the number in a multiplication.



In 8^2 the "2" says to use 8 twice in a multiplication,

$$\text{So } 8^2 = 8 \times 8 = 64$$

In words: 8^2 could be called "8 to the power 2" or "8 to the second power", or simply "8 squared"

Exponents are also called Powers or Indices.

Example: $5^3 = 5 \times 5 \times 5 = 125$

- In words: 5^3 could be called "5 to the third power", "5 to the power 3" or simply "5 cubed"

Example: $2^4 = 2 \times 2 \times 2 \times 2 = 16$

- In words: 2^4 could be called "2 to the fourth power" or "2 to the power 4" or simply "2 to the 4th"

Another Way of Writing It

Sometimes people use the ^ symbol (above the 6 on your keyboard), as it is easy to type

Example: 2^4 is the same as 2^4

- $2^4 = 2 \times 2 \times 2 \times 2 = 16$

What if the Exponent is 1, or 0?

1 If the exponent is 1, then you just have the number itself (example $9^1 = 9$)

0 If the exponent is 0, then you get **1** (example $9^0 = 1$)

But what about 0^0 ? It could be either 1 or 0, and so people say it is "indeterminate"

Be careful about Grouping

To avoid confusion, use parentheses () in cases like this:

With () :	$(-2)^2 = (-2) \times (-2) = 4$
Without () :	$-2^2 = -(2^2) = -(2 \times 2) = -4$
With () :	$(ab)^2 = ab \times ab$
Without () :	$ab^2 = a \times (b)^2 = a \times b \times b$

Exponent law of multiplication

$\Rightarrow x^m \times x^n = x^{m+n}$, [If base is same power will be addition]

Example: $x^2x^3 = (xx)(xxx) = xxxxx = x^5$

So, $x^2x^3 = x^{(2+3)} = x^5$

Exponent law of Division

$\Rightarrow x^m \div x^n = x^{m-n}$ [If base is same power will be subtracted]

Example: $x^4/x^2 = (xxxx) / (xx) = xx = x^2$

So, $x^4/x^2 = x^{(4-2)} = x^2$

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