

Expressions/Equations/Inequalities

We need to be able to tell the difference between three basic math constructions: *expressions*, *equations* and *inequalities*. Let's list what to look for in each:

Expressions

Equations

Inequalities

Terms

An expression is made up of one or more *terms*. In math, a term is a collection of numbers and variables that are connected with multiplication and/or division. Thus, whenever you see an addition or subtraction sign, you are seeing the break between terms.

Look at these examples:

- $3xy$ is 1 term
- $2a + 3b$ is 2 terms
- $5a + 2ab - c$ is 3 terms

Now, let's practice. Write the number of terms in each of the following expressions:

- $5ab - 2b$
- $\frac{24x}{y^2}$
- $2x^2 + 5x - 3$

The expression $3x^2$ has one term. It also has three parts: *coefficient*, *variable*, and *exponent*. Let's label each part:

$$3x^2$$

- Coefficient:
- Variable:
- Exponent:

Like Terms

Two or more terms are *like terms* when they have exactly the same variables, and each of the variables have exactly the same exponents. Let's look at some examples.

The following pairs of expressions are like terms:

$2xy, 3xy$

$5x^2, -2x^2$

$2ab, 3ba$

The following pairs of expressions are not like terms:

$2x, 3x^2$

$3a, 2ab$

$2x^2y, 4xy^2$

We are most interested in like terms, because they can be combined with addition and subtraction. In this manner, like terms are a bit like silverware. (You would combine different piles of spoons, but you wouldn't combine a pile of spoons with a pile of forks.)

When we have expressions, we simplify them by combining like terms. Let's try some together:

- $2 \text{ forks} + 3 \text{ spoons} + 5 \text{ forks}$

- $2a + 5b + a + 3b$

- $6x + 2y - 3x - y$

- $5x^2 + 2x - 3x^2$

- $3x + 3$

- $10x - 4x - 6x$

Now, here are some examples for you to try.

1. Simplify each of the following expressions:

(a) $3a^2 + 5a - 1$

(b) $3a^2 + 5a - a^2 - 2a$

(c) $6x + 4y - 2x + 4 - 2y - 1$

(d) $x + x + x$

(e) $2a + 3b - a - 2b - 1$

(f) $3x + y + y - 2x$

(g) $\frac{1}{2}x + y + \frac{1}{2}x + y$

(h) $\frac{3}{2}x - \frac{1}{2}x$

(i) $2a + 5b - a - 3b - 2$

(j) $3x^2 - 2x + 4$

(k) $5a + 4 - 3a - 2$

(l) $3a + 5a^2 + 3a$