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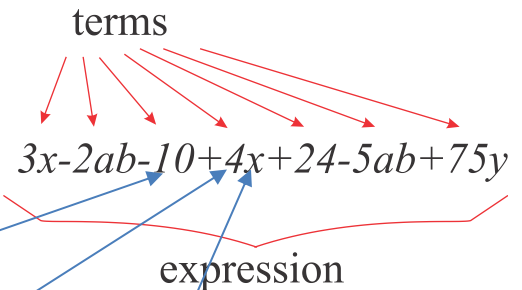
Expressions and equations

terms

Mathematical expressions - phrases that contain numbers, symbols, letters also known as terms

$3x\text{-}2ab\text{-}10\text{+}4x\text{+}24\text{-}5ab\text{+}75y$

expression

Terms can be:

- Numbers -"constants".

- Letters -"variables"

- Numbers - ("coefficients") combined with ("variables")

The "like terms" in the expression above are ones that have the same variable.

All constants are like terms

To simplify the expression all like terms should be combined

$3x - 2ab - 10 + 4x + 24 - 5ab + 75y = 3x + 4x - 2ab - 5ab + 75y - 10 + 24 = 7x - 7ab + 75y + 14$

EQUATION

An equation is a statement that the values of two mathematical expressions are equal (indicated by the sign =). *An equation will always contain an equal sign with an expression on each side.*

Equation: $a + 2 = 6$ a true expression for only one value of $a = 4$.

How to solve an equation?

$$3x - 5 = 4x - 7$$

Solving the equation, means to find such number x that will make the equality true.

First, we must combine all like terms of the expressions.

To keep the equality balanced, equal terms should be added to or subtracted from both sides

Or the term can be moved to another side of the equation with the opposite sign.

$$3x + 5 = 4x - 7$$
$$3x - 3x + 5 = 4x - 3x - 7$$
$$5 = x - 7$$
$$5 + 7 = x - 7 + 7$$
$$12 = x$$

Both sides of the equation can be divided (or multiplied) by the same number (or term) and as the result we will get the equality again.

$$4 \cdot (x - 5) = 12$$

$$\frac{4 \cdot (x - 5)}{4} = \frac{12}{4}$$

$$x - 5 = 3$$

$$x - 5 + 5 = 3 + 5$$

$$x = 8$$

Properties of Equalitie

Addition Property	If $a = b$, then $a + c = b + c$.
Subtraction Property	If $a = b$, then $a - c = b - c$.
Multiplication Property	If $a = b$, then $a \cdot c = b \cdot c$.
Division Property	If $a = b$ and $c \neq 0$, then $\frac{a}{c} = \frac{b}{c}$.
Reflexive Property	$a = a$
Symmetric Property	If $a = b$, then $b = a$.
Transitive Property	If $a = b$ and $b = c$, then $a = c$.
Substitution Property	If $a = b$, then b can replace a in any expression.