

Expressions

Definitions

A **variable** is a symbol which represents a number or a number that can vary.

An **expression** is a mathematical sentence or statement.

A **variable** or **algebraic expression** is an expression which contains variables.

A **term** is each part of the expression separated by =, inequality, + or -. A term has a **coefficient** (number part, may be 1 or -1) & may have a **variable part**. $3 - x = 6y$, where $-x = -1 \cdot x$.

Like terms are those terms with the same variables to the same power:

$$xy \text{ \& } 3xy \qquad 5a^2 \text{ \& } 2a^2.$$

An algebraic expression is **simplified** when all like terms have been combined.

A sum or difference of like terms can be simplified using the distributive property.

Distributive Property: If a , b , and c are numbers, then

$$ac + bc = (a + b)c$$

$$ac - bc = (a - b)c$$

How To:

Combine like terms, only like terms can be combined with Addition & Subtraction, use the commutative property to get like terms next to each other, then add or subtract as appropriate.

$x^2y + xy - y + 10x^2y - 2y + xy \rightarrow$ use the commutative property to get like terms next to each other \rightarrow

$x^2y + 10x^2y + xy + xy - y - 2y \rightarrow$ remember if no coefficient is written, a 1 is understood \rightarrow

$$1x^2y + 10x^2y + 1xy + 1xy - 1y - 2y \rightarrow 11x^2y + 2xy - 3y$$

Simplify an expression, use the distributive, commutative & associative properties, then combine like terms.

$-(12ab - 10) + 5(3ab - 2) \rightarrow$ use the distributive property to distribute what is in front of the parentheses to the terms inside \rightarrow

$-12ab - -10 + 5(3ab) - 2(5) \rightarrow -12ab + 10 + 15ab - 10 \rightarrow$ use the commutative property of addition to group like terms together \rightarrow

$$-12ab + 15ab + 10 - 10 \rightarrow \text{then combine} \rightarrow 3ab + 0 \rightarrow 3ab$$

Evaluate an expression, insert the appropriate value for each variable and simplify.

$-8x + 2y - 3z$ evaluated at $x = 1$, $y = 2$ & $z = -1$ replace the x , y and z with their values. Parentheses make it easier to keep negative and minus signs straight.

$$-8(1) + 2(2) - 3(-1) \rightarrow -8 + 4 + 3 \rightarrow -1$$

$4x + 5y$ evaluate at $x = -5$, $y = -3$ replace the x & y with their values. Parentheses make it easier to keep negative and minus signs straight.

$$4(-5) + 5(-3) \rightarrow -20 + -15 \rightarrow -35$$

REMINDERS:

$x + x + x = 3x$, we are adding the same thing to itself 3 times.

$x * x * x = x^3$, we are multiplying the same thing to itself 3 times.