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*x.

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

xy & 3xy $5a^2$ & $2a^2$.

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.

- $x^2y + xy – y + 10x^2y – 2y + xy$ → use the commutative property to get like terms next to each other →
- $x^2y + 10x^2y + xy + xy – y – 2y$ → remember if no coefficient is written, a 1 is understood →
- $1x^2y + 10x^2y + 1xy + 1xy – 1y – 2y$ → $11x^2y + 2xy – 3y$

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

- -(12ab – 10) + 5(3ab – 2) → use the distributive property to distribute what is in front of the parentheses to the terms inside →
- -12ab - -10 + 5(3ab) – 2(5) → -12ab + 10 + 15ab – 10 → use the commutative property of addition to group like terms together →
- -12ab + 15ab + 10 – 10 → then combine → 3ab + 0 → 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) → -8 + 4 + 3 → -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) → -20 + -15 → -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.