MATH: FOREIGN LANGUAGE: ALGEBRA

Like a foreign language, mathematics has unfamiliar terms and symbols. These are put into sentences called *expressions or equations*. Understanding and solving a mathematics equation is the same as understanding a sentence in a foreign language. When the correct symbol is used, the meaning of the mathematical sentence is conveyed clearly and precisely. The following mathematical symbols and their use may help you speak algebra fluently, like a native!

**Natural Order of Operations**

You can use the acronym - EMDFAS to remember this. Or, the sentence - *Every Martian dances fast and slow.*

Here is the order:  
1. Exponentiation
2. Multiply and/or Divide working from left to right
3. Functions
4. Add and/or Subtract working from left to right

That is:
1. Square x
2. Multiply by y
3. Take the ln
4. Add z

**Grouping Symbols**

Don’t be afraid to add grouping symbols to *emphasize* the natural order. They will clarify what you have done. You can’t get too many as long as they’re used appropriately. Leaving them out, however, can get you into trouble!

- **parentheses** English: By using any pair of these “grouping symbols,” you are saying:
  - This is a road sign
  - I am changing directions

- **brackets** Math: I am superseding the order of operations.

- **braces** Generally, these are applied from *inside* the expression *outward* to ends.

You can perform the inside operation first and move outward from there. Example:

\[ 2\{3[4(x+1)+5]+6\} = 2\{3[4x+9]+6\} = 2\{12x+33\} = 24x+66 \]

*However, as long as you do what the symbol says, you will arrive at the right answer no matter where you start!* (you just can’t beat a deal like that!) Example:

\[ 2\{3[4(x+1)+5]+6\} = 6\{4(x+1)+5\}+12 = 24(x+1)+42 = 24x+66 \]
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The most frequently abused, overused, and misused term in math is the **equals sign**. It should be used as a last resort and only when you mean *exactly the same as*. (See last item on this page for its proper usage). In the meantime, try these other terms to accurately convey your meaning:

→

**Arrow**
- implies
- leads to
- approaches
- yields
- if first is true, then second is true

∴

**Therefore**
- logical consequence
- bottom line conclusion

∵

**Similar**
- is related to
- like
- general
- is safe to use, usually can't go wrong!

And now for the big finish:

= 

**Equals**
- identical
- exactly the same as
- quantities are substitutable
- use sparingly and only as a last resort
- could be hazardous to your grade if used incorrectly!

This is a very precise and beautiful sign.

When its integrity and purity are preserved, it works like an open channel (=) that can lead to a crisp, clear finish!