Quick Guide to Order of Operations

To **do the operations in the right order**, remember **PEMDAS**, which stands for:

Parentheses, Exponents, Multiplication-Division, Addition-Subtraction.

P *Start by working inside parentheses, innermost first.*
E *Simplify any exponent expression next.*
M-D *Then work all multiplication and division, from left to right, as they appear.*
A-S *Finally work all addition and subtraction from left to right.*

ACRONYM TIP: **P**owerful **E**arthquakes **M**ay **D**eliver **A**fter-**S**hocks.

Example: What is 2 + 3 x 4 ?
Do it in your head, and then try it on your calculator.
If either answer is 20, then think again (and get a better calculator!).
Don't do the 2 + 3 (addition) until all multiplications are done:

2 + 3 x 4 = 2 + 12 = 14 *(the answer!)*

Question: What's wrong with doing 2 + 3 = 5, then 5 x 4 = 20?
Some calculators will give you 20; throw them out or send them back to the factory, then get a "scientific" calculator (about $9).

Example: What about **PEMDAS** in 3 + 4 x 6 2 from the previous section?
Well, again the multiplication has been done first; 4 x 6 = 24. Answer = 25.

Prime Numbers and Factorizations
Primes are a lot of fun for me; they're the "building blocks" of the natural numbers!
First things first: 1 (one) is NOT a prime. Well then, what is?

Definition: A prime number is a natural number with exactly two divisors.
This **excludes 1**, since it has only itself as a divisor.

Every whole number starting with 2 can be written as a product of primes; for example 10 = 2 x 5 or 2 * 5, while 36 = 2 * 2 * 3 * 3. This is called the **prime factorization** of the number, and is what gives each number its own individual character, or "DNA sequence," if you will.

With the help of exponents, we can write: 36 = 2^2 * 3^2, or 1 million = 10^6 = (2 * 5)^6 = 2^6 * 5^6.

How can you tell if a number is prime? . . . *(11/97)*

Let's try 101. We can try 2, see if it goes into 101 (it doesn't), then 3 (it doesn't either), etc. We don't need to try 4 because 2 didn't go in, so we only need to try dividing in primes. We quickly see that 2, 3, 5, and 7 don't go into 101. The next prime is 11; but 11 x 11 = 121, more than 101. If anything goes into 101, it must be less than 11. But we tried all that stuff before. So **101 is prime**!

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