Order of Operations - *PEMDAS*

Operations

***"Operations"*** means things like add, subtract, multiply, divide, squaring, etc. If it isn't a number it is probably an operation.

But, when you see something like ...

7 + (6 × 52 + 3)

... what part should you calculate first?   Start at the left and go to the right?  Or go from right to left?

*Warning: Calculate them in the wrong order, and you will get a wrong answer !*

So, long ago people agreed to follow rules when doing calculations, and they are:

Order of Operations

Do things in Parentheses First. Example:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | 6 × (5 + 3) | = | 6 × 8 | = | **48** |  |
|  |  | 6 × (5 + 3) | = | 30 + 3 | = | 33 | (wrong) |

[Exponents](http://www.mathsisfun.com/exponent.html) (Powers, Roots) before Multiply, Divide, Add or Subtract. Example:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | 5 × 22 | = | 5 × 4 | = | **20** |  |
|  |  | 5 × 22 | = | 102 | = | 100 | (wrong) |

Multiply or Divide before you Add or Subtract. Example:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | 2 + 5 × 3 | = | 2 + 15 | = | **17** |  |
|  |  | 2 + 5 × 3 | = | 7 × 3 | = | 21 | (wrong) |

Otherwise just go left to right. Example:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | 30 ÷ 5 × 3 | = | 6 × 3 | = | **18** |  |
|  |  | 30 ÷ 5 × 3 | = | 30 ÷ 15 | = | 2 | (wrong) |

How Do I Remember It All ... ? PEMDAS !

|  |  |
| --- | --- |
| **P** | **P**arentheses first |
| **E** | **E**xponents (ie Powers and Square Roots, etc.) |
| **MD** | **M**ultiplication and **D**ivision (left-to-right) |
| **AS** | **A**ddition and **S**ubtraction (left-to-right) |

Divide and Multiply rank equally (and go left to right).

Add and Subtract rank equally (and go left to right)