ACADEMIC SUPPORT CENTER
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Order of Operations

The *Order of Operations* are the rules for solving equations (or expressions) that have more than one mathematical operation.

VERY IMPORTANT: Always work problems from **left** to **right**

Step	Explanation	Example
1. Parentheses*	First, do all work inside the parentheses. * Parentheses are one type of grouping symbol. Operations that should be done under the "parentheses" category are those in symbols such as brackets, braces, absolute value bars, or under a radical sign, and operations in the numerator or denominator of a fraction.	Simplify the Expression $3^2 + 7 - 5\ (9 - 1)$ $= 3^2 + 7 - 5$ **(8)**
2. Exponents	Next, simplify any exponents or radicals.	= **9** + 7 – 5 (8)
3. Multiplication and Division	These two operations are of equal importance. Perform whichever of these operations comes first going from left to right.	= 9 + 7 – **40**
4. Addition and Subtraction	These two operations are of equal importance. Perform whichever of these operations comes first going from left to right.	= **16** – 40 = - 24

The word **PEMDAS** or phrase **P**lease **E**xcuse **M**y **D**ear **A**unt **S**ally are often used to help remember these steps (**P**arentheses, **E**xponents, **M**ultiplication and **D**ivision, **A**ddition and **S**ubtraction).

Examples

$2 - 8 \div 4 \cdot 6$
$= \mathbf{2} - 2 \cdot 6$
$= 2 - \mathbf{12}$
$= -10$

Check first for parentheses, then exponents. Since there are none, move on to multiplication or division. Both operations are present, and because division comes first, going from left to right, you will do the division first ($- 8 \div 4$). Multiplication comes next ($-2 \cdot 6$), and then subtraction ($2 - 12$).

$4 + 2\ [8 - (5 + 2)]$
$= 4 + 2\ [8 - (\mathbf{7})]$
$= 4 + 2\ \mathbf{(1)}$
$= 4 + \mathbf{2}$
$= 6$

Here we have parentheses within brackets. Start working the problem from the inside out; in other words, begin with the computation inside of the parentheses (5 + 2) to obtain 7. Then do the computation inside of the brackets (8 - 7). Follow with the next operation of importance, multiplication 2 (1) and complete the problem by adding (4 + 2).