Order of Operations Cheat Sheet

There is a specific order in which math problems should be worked out. It is called the "order of operations." If you do not work math problems in the correct order, you probably will get the wrong answer. It is like a step-by-step recipe to work out a math problem that will lead you to the correct answer.

1st Parenthesis & Grouping Symbols – 2nd Exponents – 3rd Multiply or Divide – 4th Add or Subtract

Hint: Please guys, excuse my dear Aunt Sally.

PG E MD AS

P	Parenthesis	**1st** Do the parenthesis and all other grouping symbols.	Examples: Parenthesis: (6 + 7) Brackets: [(3 + 2) – (2-1)] Brackets usually go around a set of parenthesis. Work inside the brackets first until there is nothing left to do. Fraction Bars: $\frac{6\cdot 8}{10+2} = \frac{48}{12} = 4$ Do everything above the fraction bar, then everything below the fraction bar, and then divide.
G	Grouping symbols such as brackets or a fraction bar.		
E	Exponents	**2nd** Do all exponents.	Examples: $2^3 = 2\cdot 2\cdot 2 = 8$ $4^2 = 4(4) = 16$
M	Multiply	**3rd** Multiply or divide from LEFT TO RIGHT	Examples: Sometimes you multiply first, but sometimes you divide first. You decide by going left to right. Multiplying comes first: $6\cdot 2 \div 4$ → $3 \div 4$ → 12 Dividing comes first: $18 \div 3\cdot 5$ → $6 \cdot 5$ → 30
D	Divide		
A	Add	**4th** Add or subtract from LEFT to RIGHT	Examples: Sometimes you add first, but sometimes you subtract first. You decide by going left to right. Adding comes first: $4 + 2 - 5$ → $6 - 5$ → 1 Subtracting comes first: $7 - 3 + 3$ → $4 + 3$ → 7
S	Subtract		

Examples of using the proper order of operations:

Example 1:

$(17 + 3) + 2^3 \div 4 \cdot 2$

$\underline{(17 + 3)} + 2^3 \div 4 \cdot 2$ ← 1st – parenthesis

$20 + \underline{2^3} \div 4 \cdot 2$ ← 2nd – exponents

$20 + \underline{8 \div 4} \cdot 2$ ← 3rd – divide

$20 + \underline{2 \cdot 2}$ ← 4th – multiply

$\underline{20 + 4}$ ← 5th – add

24 ← Answer

Example 2:

$2[6 + (4 - 3)] - 5$

$2[6 + \underline{(4 - 3)}] - 5$ ← 1st – inner parenthesis

$2[\underline{6 + 1}] - 5$ ← 2nd – brackets

$\underline{2[7]} - 5$ ← 3rd – multiply

$\underline{14 - 5}$ ← 4th – subtract

9 ← Answer

Example 3:

$\frac{11+7}{2 \cdot 3} - 3 + 10$

$\frac{11+7}{2 \cdot 3} - 3 + 10$ ← 1st – grouping symbols (above & below fraction bar)

$\frac{18}{6} - 3 + 10$ ← 2nd – divide

$3 - 3 + 10$ ← 3rd – subtract

$0 + 10$ ← 4th – add

0 ← Answer

Example 4:

$3^3 - \frac{7+3}{2} + 2$

$3^3 - \frac{7+3}{2} + 2$ ← 1st – grouping symbols (above & below fraction bar)

$3^3 - \frac{10}{2} + 2$ ← 2nd – divide (finish the grouping symbol)

$3^3 - 5 + 2$ ← 3rd – exponent

$27 - 5 + 2$ ← 4th – subtract (because it comes first)

$22 + 2$ ← 5th – add

24 ← Answer