

Notes for Order of OperationsWhat are Order of Operations?

It is an order to how we calculate answers. First we simplify grouping symbols, then exponents, then multiplying and dividing. Finally adding and subtracting.

Why do we have an order (of operations)?

We have an order so that everyone--all across the world--arrives at the same answer for the same given problem.

Are there any tricks to remembering the order?

Some people remember PEMDAS (see below) when thinking of the Order of Operations, but that can be a little deceptive as there is a bit more to it. Keep in mind the following notes.

ORDER OF OPERATIONS

(Please Excuse My Dear Aunt Sally—PEMDAS)

1. parentheses (grouping)
2. exponents
3. multiplication/division (left to right)
4. addition/subtraction (left to right)

Important notes to keep in mind.

1. The “Parentheses” step includes all grouping symbols, such as (parentheses), [brackets], fraction bars separating multi-step numerators and denominators, and $|absolute\ value|$.
2. Order of operations is followed within grouping symbols.
Example: $\frac{3+4 \cdot 5}{10-3^2} = \frac{3+20}{10-9} = \frac{23}{1} = 23$ (Take note of the big fraction bar grouping symbol.)
3. When simplifying “Exponents”, make sure you note whether or not the sign is being squared, cubed, or raised to a higher power.
Examples: $(-3)^2 = 9$
 $-3^2 = -9$
 $-(3)^2 = -9$
 $0 - 3^2 = 0 - 9 = -9$
4. Multiplication and division happen at the same time, from left to right in the problem.
5. Distributing (by multiplying) a number across parentheses is a form of multiplication.
Examples: $9 \cdot 3 \div 10 = 27 \div 10 = 2.7$ (multiplication first)
 $9 \div 3 \cdot 10 = 3 \cdot 10 = 30$ (division first)
 $8(3+x) = 8 \cdot 3 + 8 \cdot x = 24 + 8x$ (distributing)
6. Taking a negative of a number is like multiplying by negative one.
Example: $-(-5) = (-1)(-5) = 5$
7. Adding and subtracting happen at the same time, starting at the left and moving to right in the problem.
Examples: $3+7-4 = 10-4 = 6$ (adding first)
 $3-7+4 = -4+4 = 0$ (subtracting first)

Name _____

Date _____

Class _____

RECALL SYMBOLS:

division	$\frac{a}{b}$, a/b , $a \div b$, $b \overline{)a}$
multiplication	$a \times b$, $a \cdot b$, $(a)(b)$, ab