

Order of Operations

Coach Odom

Order of Operations

- What are some things that you have to do in a certain order each morning?
- In math, we must also have an order to do things.

Order of Operations

- Why do we need an order of operations in math?
- Two students answer the problem $5+6\times 7$ different ways

$$5+6\times 7$$

$$=11\times 7$$

$$=77$$

$$5+6\times 7$$

$$=5+42$$

$$=47$$

Which student is correct?

Order of Operations

So, we must have an order to do things in math.

What is that order?

Parenthesis

Exponents

Multiplication

Division

Addition

Subtraction

Order of Operations

- Of course, you all remember it using the mnemonic device:

Please

Excuse

My

Dear

Aunt

Sally

Order of Operations

- Evaluate each expression for $n=8$

$$=n+(13-n)\div 5$$

$$=8+(13-8)\div 5$$

$$=8+5\div 5$$

$$=8+1$$

$$=9$$

Order of Operations

- Division is a grouping symbol

Ex: For $n=8$

$$\frac{n + 24}{2n} = \boxed{} = \boxed{} = \boxed{}$$

Your Turn:

- Evaluate when $x=12$

$$3 \cdot x + (x \div 3) \quad \square$$

$$\frac{x + 4}{14 - x} \quad \square$$

What about expressions with exponents?

- Ex: When $n=8$

$$\frac{7 \cdot 4}{n \cdot 7^2 - 1} = \boxed{} = \boxed{} = \boxed{}$$

One more!

Evaluate $3x^2 + 1$ when $x=4$

$$\boxed{} = \boxed{} = \boxed{} = \boxed{}$$

Try on your own

- Evaluate when $x=2$

$$2x^2 + 5 \quad \square$$

$$8 - x^2 \quad \square$$

$$6 - 3x^3 \quad \square$$

$$20 - 4x^2 \quad \square$$

Left to right rule

- When operations have the same priority (multiplication and division or addition and subtraction), we solve them working left to right.

- Ex: $24-8-6$

$$(24-8)-6$$

$$16-6$$

$$=10$$

Left-to-right rule

- Ex:

$$\begin{aligned} &15 \times 2 \div 6 \\ &= 30 \div 6 \\ &= 5 \end{aligned}$$

Ex:

$$16 + 4 \times 2 - 3$$

$$16 + (4 \times 2) - 3$$

$$16 + 8 - 3$$

$$24 - 3$$

$$21$$

On your own

- Evaluate when $x=1$

$$4x^2 + 5 - 3 \quad \square$$

$$5 - x^3 - 1 \quad \square$$

Closing

- We must have an order of operations in math. Without it, many answers could be correct.
- The order of operations in math is:
Parenthesis, Exponents, Multiplication,
Division, Addition, and Subtraction