TOPIC: ALGEBRAIC EXPRESSIONS

- **Algebraic Expression:** Combination of numbers and _____ with math operations.
  - **Variable:** Letter which represents any number → value **[CAN | DOESN'T]** vary → usually ___
  - **Coefficient:** Number multiplying a variable → value **[CAN | DOESN'T]** vary → usually at _____
  - **Constant:** Number without variables → value **[CAN | DOESN'T]** vary → usually at _____

Numerical Expressions (*Numbers, operations*)	**Algebraic Expressions** (*Numbers, operations, _____ variables*)
$2(3) + 5$	$2x + 5$

EXAMPLE: Determine if each of the following are algebraic expressions. Identify any coefficients & constants.

(A) $4\sqrt{x} + 8$	(B) $\frac{3(14+5)}{6}$	(C) $2 - 3xy$	(D) $9x = 18$
Numbers? ☐	Numbers? ☐	Numbers? ☐	Numbers? ☐
Operations? ☐	Operations? ☐	Operations? ☐	Operations? ☐
Variables? ☐	Variables? ☐	Variables? ☐	Variables? ☐
[YES | NO]	**[YES | NO]**	**[YES | NO]**	**[YES | NO]**
Coefficient: ___	Coefficient: ___	Coefficient: ___	Coefficient: ___
Constant: ___	Constant: ___	Constant: ___	Constant: ___

Note: When expressions have an ___ symbol between them, it forms an **equation.**

Evaluating Algebraic Expressions

- Just like with numbers, you'll often have to $+, -, \times, \div$ variables when given their exact values.
  - This is called **evaluating** an expression: _____ given values for variable(s) & use **PEMDAS.**

EXAMPLE: Evaluate the algebraic expressions when $x = 3$

(A) $2x + 5$

(B) $-\frac{2(8-x)}{4x}$

ORDER OF OPERATIONS

Parentheses
Exponents
Multiply/**D**ivide
Add/**S**ubtract

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PRACTICE: Evaluate the algebraic expression when $x = 4$ and $y = -5$.

$$2y - x(3 + y)$$

ORDER OF OPERATIONS

Parentheses
Exponents
Multiply/**D**ivide
Add/**S**ubtract

PRACTICE: Evaluate the algebraic expression when $x = -3$ and $y = 2$.

$$x(20 - 15y) - |2x + y|$$

Exponents in Expressions

- We use exponents to represent _____ multiplication.

$\underbrace{4 \cdot 4 \cdot 4 \cdot 4 \cdot 4}_{5 \text{ times}} =$ ___

"__ to the ___ *power*"

$x^3 =$

"__ _____"

General Form of Exponents

$\underbrace{a \cdot a \cdot \ldots \cdot a \cdot a}_{n \text{ times}} =$ ___

"a to the n^{th} *power*"

- **Base**: _____ being multiplied
- **Exponent** or **Power**: number of _____ base is multiplied

EXAMPLE: Evaluate the algebraic expression when $x = 2$ and $y = 5$.

(A) $-3x^4$

(B) $y^2 + 10^2$

(C) $(x^3 + 4y) - 7$

Caution!
Evaluate exponents BEFORE doing other operations!

ORDER OF OPERATIONS

Parentheses
Exponents
Multiply/**D**ivide
Add/**S**ubtract

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Simplifying Algebraic Expressions

- We write long expressions in a simpler form by _____ the # of terms.

  Term: Parts of expressions separated by or signs

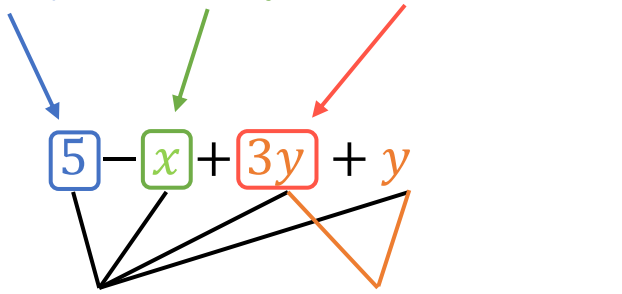
  Like Terms: Terms with the same _____ to the same _____

$$4x + 6 - 3(x + 2)$$

Simplifies to

Terms in Expressions

Number only *(constant)* Variable only Number AND variable



_____ _____

EXAMPLE: Simplify the algebraic expression.

$$2x + 3 + 4(x + 2)$$

SIMPLIFYING ALG. EXPRESSIONS

1) _____ constants/variables into parentheses (if any)
2) _____ like terms by writing them next to each other
3) _____ like terms by adding/subtracting

PRACTICE: Simplify $-3(5 - x) + 10 - 7x$

PRACTICE: Simplify $-13 + 4x + x(9 - x)$

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PRACTICE: Simplify $3x + 14y - 7(-x + 2y)$

SIMPLIFYING ALG. EXPRESSIONS
1) Distribute constants/vars through parentheses
2) Group like terms
3) Combine like terms