AIM: 2-2 I will be able to use *Order of Operations* to evaluate numerical expressions!

Name _____   Date _____
Mrs. Ashley   Math 6 – Period _____

Warm-up: You buy a used guitar for $50. You then pay $10 for each of five guitar lessons. The total cost can be found by evaluating the numerical expression below:

$$50 + 10 \cdot 5$$

Will the total cost be **$100** or **$300**? Show your work below.

Work Space:

$$50 + 10 \cdot 5$$
$$60 \cdot 5$$
$$\$300$$

$$50 + (10 \cdot 5)$$
$$50 + 50$$
$$\$100$$

Explain, in complete sentences, how you got your answer!

The total cost will be $100 because EACH lesson is $10. Five lessons will cost $50 (5 x $10). Add the cost of the guitar to get $100.
Order of operations tells us to multiply before addition

_____

VOCABULARY:

EVALUATE - To find the ___value___ of a mathematical expression. (answer)

ORDER OF OPERATIONS - The rules to follow when more than one operation is used. (PEMDAS) GEMDAS   (+, −, ×, ÷)
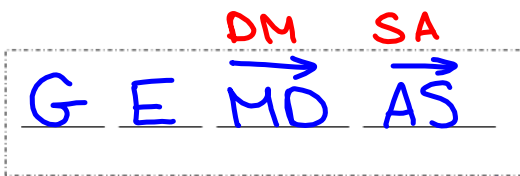
VARIABLE - A symbol, usually a letter, used to represent a number.   x = 3   y, n

EXPRESSION - A mathematical sentence containing numbers, variables, and operation symbols. Does not include an ___equal___ sign.   (+, −, ×, ÷)

Let's Investigate: Why is the *ORDER OF OPERATIONS* important? (video)

<mark>**Order of Operations**</mark>

$$\begin{array}{cc} & DM \quad SA \\ G \quad E \quad MD \quad AS \end{array}$$

Step 1: Grouping symbols ⟶ ( ) [ ] { } ½↑ fraction bar

Step 2: Exponents

Step 3: Multiply and/or Divide (Left to Right)

Step 4: Add and/or Subtract (Left to Right)

Please Excuse (My Dear) (Aunt Sally)

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Evaluate the following using the ORDER OF OPERATIONS!
Show work for EACH step! No (=) signs!

1) $\quad 3^2 + 5 \cdot 4$	2) $\quad (3^2 + 5) \cdot 4$
G ✗ E MD ⟶ AS $9 + 5 \cdot 4$ $9 + 20$ $\underline{29}$	G E MD ⟶ AS $(9+5) \cdot 4$ $14 \cdot 4$ $\underline{56}$
3) $\quad 12 \div 3 \cdot 2 + 4^2$	4) $\quad 12 \div (3 \cdot 2) + 4^2$
G ✗ E ✓ MD ⟶ ✓ AS ✓ $12 \div 3 \cdot 2 + 16$ $4 \cdot 2 + 16$ $8 + 16$ $\underline{24}$	G ✓ E ✓ MD ⟶ ✓ AS ✓ $12 \div 6 + 4^2$ $12 \div 6 + 16$ $2 + 16$ $\underline{18}$

5) Would you be happy if you received the following score on a math test?

Score: $100 - 50 \div 5 \cdot 10$

Show your work:

G
E
MD
AS

$100 - 50 \div 5 \cdot 10$

$100 - \quad 10 \quad \cdot 10$

$100 - \quad 100$

0

Explain your reasoning:

No! I would not want to get a ZERO on my math test.

When you follow order of operations, you must first divide, then multiply, and then subtract.

6) <u>**Can you find the error?**</u> <mark>Highlight</mark> the error in each problem. Then, rework the problem in the box to get the correct answer.

a) $10 + 16 + 34 \div 2 - 1$

<mark>26</mark> $+ 34 \div 2 - 1$
$60 \div 2 - 1$
$30 \quad - 1$
$\underline{29}$

a)
$10 + 16 + \underline{34 \div 2} - 1$
$10 + 16 + \quad 17 \quad - 1$
$\underline{26} \quad + \quad 17 \quad - 1$
$\underline{43} \quad - 1$
$\underline{42}$

b) $70 - 2(5 + 3)$

$70 - 2 \cdot (8)$
<mark>68</mark> (8)
$\underline{544}$

b)
$70 - 2(5 + 3)$
$70 - 2(8)$
$70 - 16$
54

c) $61 - 5 \cdot 2^3 + 5$

$61 - 5 \times$ <mark>6</mark> $+ 5$
$61 - 30 + 5$
$31 + 5$
$\underline{36}$

c)
$61 - 5 \times \underline{8} + 5$
$61 - \underline{40} + 5$
$21 + 5$
$\underline{26}$