AIM: 2-3 I will be able to EVALUATE algebraic expressions!

Name _____ Date _____

Mrs. Ashley Math 6 - Period _____

Warm-up: Simplify the following numerical expressions.

GEMDAS

1) $4 + 7 \times 3 - 1$

$4 + 21 - 1$

$25 - 1$

24

* 2) $6(9 + 2) + 7$

$6 \cdot 11 + 7$

$66 + 7$

73

or... $6 \cdot 9 + 6 \cdot 2 + 7$

$54 + 12 + 7$

73

3) $35 \div 7 \times 5$

$5 \cdot 5$

25

GEMDAS

Let's Investigate: Identifying and writing equivalent expressions.

Inflation is the rise in prices that occurs over time. For example, you would have paid about $7 in the year 2017 for something that cost only $1 in the year 2000.

2000		2017
$1 · 7	=	$7
$2 · 7	=	$14
$3 · 7		$21
$p · 7		$p \times 7$ → algebraic expression or 7p

A variable is a letter or symbol that represents a quantity that can change. In the table above, p is the variable that represents the price in 2000.

A constant is a quantity that does NOT change. ~~In the table above, the price of an item in 2017 is always 7 times the price in 2000.~~ (A number) No variables

An **algebraic expression** contains one or more variables and may contain operation symbols. (+, -, x, ÷). In the table, **p x 7** is an algebraic expression. (no = sign!)

Examples:

Algebraic Expression (variables)	NOT an Algebraic Expression (Numeric Expression; no variables)
150 + y	85 ÷ 5
35w + 2	10 + 3 x 5
2x + y	2 + 4 - 2
Make your own: $5y+x^2$, $3w+y$, $3+y$	Make your own: $33 \cdot 9 - 4$, $24 \div 6$

A **coefficient** is the *number in front of a variable.* In the expression **3x**, the **3** is the coefficient. If a variable does not have a number in front of it, the coefficient is **1**. → $3x$ $\equiv 1y+8$

When addition or subtraction separates an algebraic expression into parts, each part is called a **TERM**. (*Example:* 3x + 4; 3x is a term, 4 is a term)

$3x$, 4 $3x+4$ -2 terms- $3x-4$ $3x$, -4

KEY CONCEPT 1: Identify Terms, Coefficients, and Constants in algebraic expressions

$6n^2+7n-4$

a) How many terms are there? 3 List each term. $6n^2$, $7n$, -4

b) List the COEFFICIENTS: 6, 7

c) List the CONSTANTS: -4

Now You Try!

$5n^3-2n+8+5n$

a) How many terms are there? 4 List each term. $5n^3$, $-2n$, 8, $5n$

b) List the COEFFICIENTS: 5, -2, 5

c) List the CONSTANTS: 8

KEY CONCEPT 2: Evaluate Algebraic Expressions

To evaluate an algebraic expression, substitute the number for the variable and then find the value.

Mrs. Ashley's favorite mistake: Evaluate $2x$ when $x = 3$

23 or $2 \cdot 3$

6

2x means 2 times x $2 \cdot x$

Examples: Evaluate each expression below for the given variable.

1) Evaluate each expression when $x = 3$. Show your work & substitutions!

a) $5x + 1$	b) $5(x + 1)$	c) $x^2 + 5x$
$5 \cdot 3 + 1$ $15 + 1$ 16	$5(3+1)$ $5 \cdot 4$ 20	$3^2 + 5 \cdot 3$ $9 + 5 \cdot 3$ $9 + 15$ 24

Sum: 60

2) Evaluate each expression for the given variable. Show your work & substitutions!

a) $6n + n^2$, when $n = 5$	b) $\frac{16}{g}$, when $g = 4$	c) $0.5x + 6$, when $x = 6$
$6 \cdot 5 + 5^2$ $6 \cdot 5 + 25$ $30 + 25$ 55	$\frac{16}{4} \rightarrow 16 \div 4$ 4	$0.5(6) + 6$ $3 + 6$ 9

Sum: 68

3) Evaluate each expression when $a = 3$, $b = 4$, and $c = 6$. Show work & substitutions!

a) $ab - c$	b) $c^2 - b$	c) $a^3 - (b + c)$
$3 \cdot 4 - 6$ $12 - 6$ 6	$6^2 - 4$ $36 - 4$ 32	$3^3 - (4+6)$ $3^3 - 10$ $27 - 10$ 17

Sum: 55

SUMMARY:

4) Evaluate each expression below when x = 7

a) 4(x - 4)	b) 4x - 4
$4(7-4)$ → $4 \cdot 3$ → 12	$4 \cdot 7 - 4$ → $28 - 4$ → 24

Are your answers for #1 and 2 the same? Explain why or why not.

The answers are different because order of operations changes the order you do the steps. In problem A you must first subtract inside the parenthesis and in problem B you must first multiply.

A **VARIABLE** is a letter or symbol that represents a quantity that can change. Common variables are *x, y, n, p.*

A **CONSTANT** is a quantity that does NOT change. A number.

An **ALGEBRAIC EXPRESSION** contains one or more variables and may contain operation symbols. (+, −, x, ÷).

$2n + 1$; $x^2 + 2x + 4$; $3p$

A **COEFFICIENT** is the **number** *in front of* a variable.
In the expression 2y + 5, 2 is the coefficient, 5 is the constant.

When addition or subtraction separates an algebraic expression into parts, each part is called a **TERM**. *Example:* 3x + 4; 3x is a term, 4 is a term.

To evaluate an algebraic expression, substitute the number for the variable and then find the value. (Example: Evaluate **3x** when **x = 3** → 3 · 3 → 9)