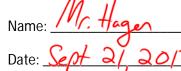
Math 9 - Unit 2: Algebra One



Lesson #1: Collecting Like Terms

In this unit, you will be introduced to one of the most important component to Mathematics: Algebra. Algebra comes from the Arabic word "al-jabr", meaning "the coming together of broken parts", and math is about bringing together ideas to solve problems. In Algebra, we will look at how to use Mathematical symbols and the rules for manipulating them. Typically, the symbols are letters.

To begin, let's define some terminology that is important in Algebra.

is like a math sentence, made up of terms and +/- signs ex: 2x2-3xy+4

is the letters used as placeholders for numbers Liunkhown -> the value varies

Coefficient:

is the sign (+-) and number infront of a variable ex: 2xy -8w +5

Constant:

- is a number without a variable - never changing

Like terms:

La term is one item from an expression La it is made up of coeffints and variable.

La terms are separated by + and - signs.

- like terms are terms with the exact same Unlike terms: Variable and exponent combination.

ex: 3xy and 4/x ex: 3xx and 4xy are like terms are like terms. ex: 4xw and 3x are unlike terms
ex: 2xy and 5xx are unlike terms **Example:** Given the following expressions, state the number of terms, the coefficients, and the constant term.

a)
$$3x^2-5x+7$$
b) $-5y+10x+8-12y$
3 terms

3 and -5 are coefficients

7 is the constant term

8 is the constant term.

In the above example, the second expression has 4 terms, but two of them had the same variable. This means that we can combine them together. All you need to do is add, or subtract, their coefficients. This process is called collecting like terms.

Collect the like terms in the above example:
$$-5y+10x+8-12y$$
 $= -17y + 10x + 8 - 12y$

More examples:

a) $-6-3r^2-4r+2+6r$

b) $-4k^3-8k^2+4+7k^4-16k^3-8k^2-1$
 $= -4-3r^2+2r-4$
 $= -5k^3-16k^2+3+7k^4$
 $= -3r^2+2r-4$
 $= -3r^3+2r-4$
 $= -3r^3+2r-4$

c)
$$7a^{2}b^{2} + 2a^{4} - 8a^{3}b^{3} - 4a^{2}b - 2a^{4} - 2a^{3}b^{3} + 8a^{2}b^{2}$$

$$= 15a^{3}b^{3} - 10a^{3}b^{3} - 4a^{2}b - 2a^{4}b^{3}$$

$$= 15ab - 10ab - 9ab$$

$$= -10a^3b^3 + 15a^2b^2 - 4a^2b$$

Now for a super duper big example:

$$= 3x - x^{3}y^{2} - 8x^{3}y^{5} + 5x^{3}y + 5xy + 5x^{3}y^{4}$$

$$= -8x^{3}y^{5} + 5x^{3}y^{4} + 5x^{3}y - x^{3}y^{2} + 5xy + 3x$$

to writing out expressions. It is called descer	Ild I write first?" If you did, good thinking! There is a definite order adding order.
Descending order is writing the	expression starting with the highest
exponent on the varie	expression starting with the highest able which comes first alphabetically
then you work yo	ar way down, ending with
the constant ter.	n.
Now go back to the above examples and put	them in descending order.
	ecial names for expressions with one, two, or three terms.
$4x^2$ is called a <u>Monomial</u> .	
$3x^5 - 2xy$ is called a <u>binomial</u>	
$7y^2 + 5y - 1$ is called a <u>trinomic</u>	<u>a/</u> .
Anything over that we just call a	nomial.
Finally, all polynomials have a degree, which	is just the <u>largest</u> expanent.
Examples: For each expression, collect the li	ke terms, state what type of polynomial, and the degree.
a) $\frac{-2v-2v^3-8+2v^5+7v}{=}$	b) $3xy - 4x^2y + 8x^4y + 6xy - 7x^2y - 7x^4y$
= 5V -8	= 9xy - 11x y + x y
Binomial	
Degree: 1.	$= xy' - 1/x^2y' + 9x'y'$
	Trinomial, with degree 5
	because $\chi_{y}^{y} \Rightarrow 41=5$

c)
$$\frac{7}{4}x^5 - \frac{2}{3}x^4 - \frac{4}{3}x^4 + \frac{6}{7}x^5$$

$$= \frac{7^{(7)}}{7^{(7)}} + \frac{6^{(4)}}{7^{(9)}} = \frac{2}{3} \times \frac{4}{3} \times \frac{4}{3}$$

$$=\frac{73}{28}x^5-2x^4$$

Binomial with degree 5