DECEMBER 7, 2015

UNIT 4: POLYNOMIALS

SECTION 5.1: MODELLING POLYNOMIALS

M. MALTBY INGERSOLL
MATH 9

WHAT'S THE POINT OF TODAY'S LESSON?

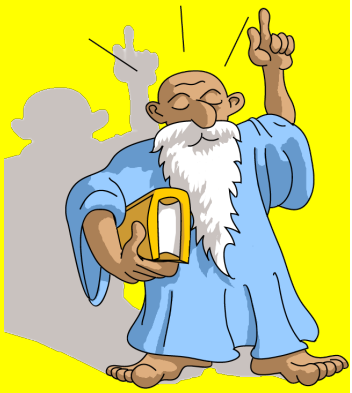
We will begin working on the Math 9 Specific Curriculum Outcome (SCO) "Patterns and Relations 5" OR PR5 which states:

PR5: "Demonstrate an understanding of polynomials (limited to polynomials of degree less than or equal to 2)."

What does THAT mean???

Polynomials, or "pre-algebra", prepare us for solving equations ("algebra").

SCO PR5 means that we will learn about the different parts of polynomials which are a combination of numbers, variables (letters) and mathematical operations (+ / - / x). We will use "algebra tiles" (little plastic rectangles and squares) to help us understand polynomials.



VOCABULARY:

1. **VARIABLE:** A letter or a symbol that we use to represent an unknown value.
   ex: Let "x" represent the height of a student.

2. **EXPRESSION:** A mathematical phrase made up of numbers and/or variables connected by mathematical operations.
   ex: $3x + 2$

3. **TERMS:** Numbers, variables, or the product of numbers and variables. Terms are separated by "+" and "-" signs. The sign directly in front of a term goes with that term.

ex: In $3x + 2$, there are two terms: $3x$ is the first term, and 2 is the second term.

ex: $8x^2 - 7x - 4$

Term 1: $8x^2$

Term 2: $-7x$

Term 3: -4

4. NUMERICAL COEFFICIENT: A number that is multiplied by a variable.

ex: $4a^2 + a$

4 is the numerical coefficient of a^2.

$a = 1a$, so 1 is the numerical coefficient of a.

5. CONSTANT TERM: A term that does NOT contain a variable.

ex: 3r - 8

-8 is the constant in this expression.

6. **POLYNOMIAL:** A mathematical expression with one or more terms in which the *exponents are whole numbers*, and the *numerical coefficients are real numbers*. They are constructed from variables, numerical coefficients, and sometimes (not always) constants, using only the mathematical operations of addition, subtraction, and multiplication (NOT division). We have seen several examples of polynomials in the previous 5 definitions:

1: x
2: $3x + 2$
3: $8x^2 - 7x - 4$
4: $4a^2 + a$
5: $3r - 8$

A polynomial is usually written in descending order - the exponents of the variables decrease from left to right.

ex: $2k - 4k^2 + 7 \longrightarrow -4k^2 + 2k + 7$

Polynomials with 1, 2, or 3 terms have special names.

* A *monomial* has *1* term. ex: $4a$; 6 ; $-2p^2$

* A *binomial* has *2* terms. ex: $2c - 5$
  $3m^2 + 3m$

* A *trinomial* has *3* terms. ex: $10h^2 - 6h - 4$

7. **DEGREE OF A POLYNOMIAL**: The term with the greatest exponent determines the degree of the polynomial.

ex: $3x^2 - 2x + 5$

This polynomial has degree 2 because of "$3x^2$". $-2x$ has degree 1 because $-2x = -2x^1$, and 5 is a constant term with degree 0 because it is technically $5x^0$ which is 5(1) or 5.

NOTE: **An algebraic expression that contains a term with a variable in the denominator or the square root of a variable is *NOT* a polynomial.**

ex: $\frac{1}{n}$ $= n^{-1}$

ex: $\sqrt{n}$ $= n^{\frac{1}{2}}$

(-1 and ½ are NOT whole numbers)

$$\frac{n}{3}$$

$$= \frac{1n}{3}$$

$$= \frac{1}{3}n$$

$$= \frac{1}{3}\left(\frac{n}{1}\right)$$

$\frac{n}{3}$ $\frac{x}{4}$

N.C. $= \frac{1}{3}$ N.C.: $\frac{1}{4}$

$$4a^2 - 6b^2 + 7ab - 10$$

Terms = 4

#1 = $4a^2$

#2 = $-6b^2$

#3 = $7ab$

#4 = -10

Vars. = a & b

Name = Polynomial

N.C. = 4, -6, 7

Constant = -10

Degree = 2

CONCEPT REINFORCEMENT:

MMS 9

* **Page 214: #4 TO #7 and #9**
* **Study for tomorrow's potential vocabulary quiz**