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**UNIT 4: POLYNOMIALS**

**SECTION 5.1:  
MODELLING  
POLYNOMIALS**

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***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.



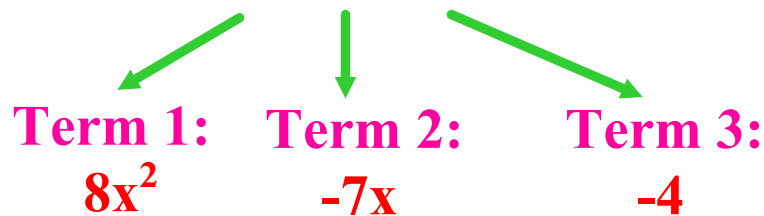
## VOCABULARY: Polynomials Chapter 5

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



**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:  $2k - 4k^2 + 7$   $\xrightarrow{\hspace{1cm}}$   $-4k^2 + 2k + 7$

**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:  $\sqrt{n}$   
 $= n^{1/2}$

(-1 and  $\frac{1}{2}$  are **NOT** whole numbers)

**CONCEPT REINFORCEMENT:*****MMS 9*****\* Page 214: #4, 5, 6, 7 and 9**

6.	Coefficient	variable	degree
a) $-7x$			
b) $14a^2$			
c) $m$			
d) $12$			