CCSS Advanced Algebra 4 AA6: Introduction to Polynomials (Part 2) Name _____

**Relevant Vocabulary:**

*EQUIVALENT POLYNOMIAL EXPRESSIONS*: Two polynomial expressions in one variable are equivalent if, whenever a number is substituted into all instances of the variable symbol in both expressions, the numerical expressions created are equal.

*POLYNOMIAL IDENTITY*: A polynomial identity is a statement that two polynomial expressions are always equivalent. For example, $(x+3)^2 = x^2 + 6x + 9$ for any real number x is a polynomial identity.

COEFFICIENT OF A MONOMIAL: The coefficient of a monomial is the value of the numerical expression found by substituting the number 1 into all the variable symbols in the monomial. The coefficient of $3x^2$ is 3, and the coefficient of the monomial $(3x)^2$ is 9.

TERMS OF A POLYNOMIAL: When a polynomial is expressed as a monomial or a sum of monomials, each monomial in the sum is called a term of the polynomial.

LIKE TERMS OF A POLYNOMIAL: Two terms of a polynomial that have the same variable symbols each raised to the same power are called like terms.

STANDARD FORM OF A POLYNOMIAL IN ONE VARIABLE: A polynomial expression with one variable symbol, x, is in standard form if it is expressed as $a_n x^n + a_{n-1}x^{n-1} + ... + a_2 x^2 + a_1 x + a_0$, where n is a non-negative integer, and $a_0,\ a_1,\ a_2,\ \ldots,\ a_n$ are constant coefficients with $a_n \neq 0$ .

The <u>degree</u> of the polynomial in standard form is the highest degree of the terms in the polynomial, namely n. The term $a_n x^n$ is called the leading term and $a_n$ (thought of as a specific number) is called the leading coefficient. The constant term is the value of the numerical expression found by substituting 0 into all the variable symbols of the polynomial, namely $a_0$.

Questions:

1. What does it mean for two Polynomial Expressions to be EQUIVALENT? Give an example.

2. How many terms are in the expression $x^2 + 6x + 9$?

3. Are $4x^2$ and $2x^4$ like terms? Why or why not?

4. Rewrite $2x + 3x^4 - 5x^2 + 7$ in Standard Form.

5. Use an area model to multiply and combine like terms.

$(x^2 - 4x + 4)(x + 3)$

- Is the answer a polynomial? Explain how you know.

$(11 - 15x - 7x^2)(25 - 16x^2)$

- Without multiplying, what is the degree of the polynomial?

$(3m^3 + m^2 - 2m - 5)(m^2 - 5m - 6)$

- Without multiplying, what is the leading coefficient for the polynomial?

$(x^2 - 3x + 9)(x^2 + 3x + 9)$

- Without multiplying, what is the constant term for the polynomial?

6. If you add one polynomial to another polynomial, will your sum also be a polynomial? What if you subtract two polynomials, will the difference be a polynomial? Give examples, one ADDITION and one SUBTRACTION, to show your thinking.

7. If you multiply one polynomial to another polynomial, will your product also be a polynomial? Give two examples to show your thinking.