9.1-9.3 POLYNOMIALS – ADDING, SUBTRACTING, AND MULTIPLYING

WHAT IS A POLYNOMIAL?

- A polynomial is an expression with multiple terms. It consists of constants, like -2 or 17, terms with variables, like 2x or $-12m$, and terms with exponents, like -13n^2. *Poly* means many and *nomial* means terms

- Proper way to write a polynomial: Terms in decreasing order, starting with the term with the biggest exponent(s).

- Examples: $3x^3 - x^2 + 1$ $2ab^4 + 4a^3b - a^2b$

- Degree of a polynomial: the largest exponent in the polynomial

- Leading Coefficient: the coefficient on the very first term, when the polynomial is written in the proper order

WHAT ARE LIKE TERMS?

- Like terms are terms that have the exact same variable(s), and the exact same exponent on the variable (s)

- Examples of like terms, and non-like terms:

Like terms	Unlike terms
$2x, -7x$	$2x, -7y$
$-8x^2, 3x^2$	$-8x^2, 3x$
$13xy, -7xy$	$13xy, -7xz$
$5x^2y, 3x^2y$	$5x^2y, 3xy^2$
$x, 4x$	$x, 4$

ADDING POLYNOMIALS

1.) Drop the parentheses on both polynomials

2.) Combine like terms

- Exs) Find each sum.

- a.) $(3x^3 + 12x - 7x^2 - 20) + (14x + 4 - 2x^2)$

- b.) $(17x^4 + 6 - 14x^2) + (10 - 5x^2 + 4x^3)$

SUBTRACTING POLYNOMIALS

1.) Drop the parentheses on ONLY the first polynomial, and rewrite below

2.) Distribute the negative throughout all terms in the second polynomial

3.) Combine like terms

- Exs) Find each difference.
- d.) $(12a^3 + 11a - 24) - (3a^3 - 4a^2 + 14a - 1)$

WARM UPS:

1) $(x^3 + 7 - 7x) + (7x^4 - 3x - 6)$

2) $(6n + 6n^2 + 6n^4) + (n + 8n^4 + 7n^2)$

3) $(3 - 5x^2 + 4x^4) - (8 - 2x^2 + 3x)$

4) $(6n^2 - 3 + 3n) - (3n^2 + 3n - 5)$

MULTIPLYING POLYNOMIALS

1.) Multiply each term in the first polynomial by each term in the second polynomial (multiply coefficients, and add exponents on variable that are the same)

2.) Simplify by combining like terms

- Exs) g.) $2x^2(3x^4 - 6x^3 + 4)$ h.) $(6y - 2)(y + 1)$ i.) $(2b^2 + 5)(b^3 + 3)$
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- j.) $(c - 2)(c + 4)$ k.) $(2x - 1)(3x^2 - x + 4)$ l.) $(2x - 3)^2$