NOTES & HOMEWORK

Name_____
Date _____ Period _____
Polynomials

Polynomial – is one term or the sum of difference of two or more terms.

For a term that has only one variable, the degree of a term is the exponent of the variable.

$x^3 - 4x + 5x^2 + 7$ ← The degree of a constant is 0.

Degree → 3 1 2 0

The dregree of a polynomial is the same as the degree of the term with the highest degree.. You can name a polynomial by its degree or by the number of its terms.

Polynomial	Degree	Name Using Degree	Number of Terms	Name using Number of Terms
$7x + 4$	1	Linear	2	Binomial
$3x^2 + 2x + 1$	2	Quadratic	3	Trinomial
$4x^3$	3	Cubic	1	Monomial
5	0	Constant	1	Monomial

The polynomials in the chart are written in standard form, which means the terms decrease in degree from left to right and no terms have the same degree.

Example:
Write each polynomial in standard form. Then name each using the table above.

a.) $5 - 2x$ b.) $3x^3 - 4 + 2x^2$ c.) $5 - 4x^2 + x^3$

Answers: $-2x + 5$ b.) $3x^3 + 2x^2 - 4$ c.) $x^3 - 4x^2 + 5$
Linear Binomial Cubic Trinomial Cubic Trinomial

Try this:
1.) $6x^2 + 7 - 9x^4$ 2.) $3y - 9 - y^3$

Adding Polynomials:
Rearrange the polynomials into standard form and then combine like terms:

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

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

$$\begin{array}{r} (2x^2 - 3x + 4) \\ +\,(3x^2 + 2x - 3) \\ \hline 5x^2 - x + 1 \end{array}$$

Try this:

1.) $(5x^2 + 4x - 7) + (-4x^2 - 1 + 8x)$

Subtracting Polynomials:
Treat this the same as adding polynomials BUT you must first distribute the negative (or subtraction sign) into the second polynomial:

$$(7x^3 - 3x + 1) - (x^3 + 4x^2 - 2)$$

$$(7x^3 - 3x + 1) + (-x^3 - 4x^2 + 2)$$

$$\begin{array}{r} (7x^3 \quad - 3x \ +1) \\ +(-x^3 \ - 4x^2 \quad\quad + 2) \\ \hline 6x^3 \ - 4x^2 - 3x + 3 \end{array}$$

Try this:

1.) $(3x^2 + 4x - 1) - (x^2 - x - 2)$

Mulitplying Polynomials:
When multiplying polynomials, you use the distributive property:

$(2x - 3)(3x^2 + x - 6)$

$= 2x(3x^2) + 2x(x) + 2x(-6) - 3(3x^2) - 3(x) - 3(-6)$ ← distribute the terms

$= \quad 6x^3 \quad +2x^2 \quad -12x \quad -9x^2 \quad - 3x \quad + 18$

$= 6x^3 - 7x^2 - 15x + 18$ ← combine like terms

Try this:

1.) $(3a + 4)(5a^2 + 2a - 3)$

Homework:

Simplify each expression.

1) $(5p^2 - 3) + (2p^2 - 3p^3)$

2) $(a^3 - 2a^2) - (3a^2 - 4a^3)$

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

4) $(4n - 3n^3) - (3n^3 + 4n)$

5) $(3a^2 + 1) - (4 + 2a^2)$

6) $(4r^3 + 3r^4) - (r^4 - 5r^3)$

7) $(5a + 4) - (5a + 3)$

8) $(3x^4 - 3x) - (3x - 3x^4)$

9) $(-4k^4 + 14 + 3k^2) + (-3k^4 - 14k^2 - 8)$

10) $(3 - 6n^5 - 8n^4) - (-6n^4 - 3n - 8n^5)$

11) $(12a^5 - 6a - 10a^3) - (10a - 2a^5 - 14a^4)$

12) $(8n - 3n^4 + 10n^2) - (3n^2 + 11n^4 - 7)$

13) $(-x^4 + 13x^5 + 6x^3) + (6x^3 + 5x^5 + 7x^4)$

14) $(9r^3 + 5r^2 + 11r) + (-2r^3 + 9r - 8r^2)$

15) $(13n^2 + 11n - 2n^4) + (-13n^2 - 3n - 6n^4)$

16) $(-7x^5 + 14 - 2x) + (10x^4 + 7x + 5x^5)$

17) $(7 - 13x^3 - 11x) - (2x^3 + 8 - 4x^5)$

18) $(13a^2 - 6a^5 - 2a) - (-10a^2 - 11a^5 + 9a)$

Find each product.

1) $6v(2v + 3)$

2) $7(-5v - 8)$

3) $2x(-2x - 3)$

4) $-4(v + 1)$

5) $(2n + 2)(6n + 1)$

6) $(4n + 1)(2n + 6)$

7) $(x - 3)(6x - 2)$

8) $(8p - 2)(6p + 2)$

9) $(6p + 8)(5p - 8)$

10) $(3m - 1)(8m + 7)$

11) $(2a - 1)(8a - 5)$

12) $(5n + 6)(5n - 5)$