

## Section P.4: Polynomials

- A Polynomial is a single term or the sum of two or more terms containing variables with whole number exponents.
- Standard Form is writing the polynomial in order from highest exponent to lowest.
- The degree of a term is the sum of the exponents on the variables.
- The degree of a polynomial is the highest degree of the given terms

Monomial: one term  $x, 3x, 4$

Binomial: 2 terms,  $2x^2 + 3x,$

Trinomial: 3 terms  $7x^3 + 4x$

$$x^2 + 5x + 6$$

## Adding and Subtracting:

$$(-9x^3 + 7x^2 - 5x + 3) + (13x^3 + 2x^2 - 8x - 6)$$

$$(7x^3 - 8x^2 + 9x - 6) - (2x^3 - 6x^2 - 3x + 9)$$

$$5x^3 - 2x^2 + 12x - 15$$

## Multiplying Polynomials:

- doing the distributive property many times.
- multiply the coefficients and add the exponents of the variables.
- FOIL: first, outside, inside, last  
used with 2 binomials

## Examples:

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

$$(3x+4)(5x-3)$$

$$x^2 + 4x + 5$$

$$15x^2 - 9x + 20x - 12$$

$$\boxed{15x^2 + 11x - 12}$$

$$\begin{array}{r} \textcircled{X} \quad 2x + 3 \\ \hline 3x^2 \quad 12x \quad 15 \end{array}$$

$$\begin{array}{r} 2x^3 \quad 8x^2 \quad 10x \quad 0 \\ \hline 2x^3 + 11x^2 + 22x + 15 \end{array}$$

Special Properties: (memorize if you want to cut down on time doing the problems).

$$\underline{(a+b)(a-b) = a^2 - b^2} \quad (a+b)^2 = a^2 + 2ab + b^2$$

$$(a-b)^2 = a^2 - 2ab + b^2$$

$$(a+b)^3 = a^3 + 3a^2b + 3ab^2 + b^3$$

$$(a-b)^3 = a^3 - 3a^2b + 3ab^2 - b^3$$

Examples:

$$(x+4y)(3x-5y)$$

$$3x^2 - 5xy + 12xy - 20y^2$$

$$3x^2 + 7xy - 20y^2$$

$$(5x+3y)^2$$

$$25x^2 + 30xy + 9y^2$$

$$(7x+5+4y)(7x+5-4y)$$

$$(7x+5)^2 - (4y)^2$$

$$49x^2 + 70x + 25 - 16y^2$$

$$(3x+y+1)^2$$

$$\otimes \underline{3x+y+1}$$

Suggested Homework:

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3, 7, 11, 13, 17, 19, 27, 35, 43,

49, 55, 67, 73, 79, 93, 95