

## POLYNOMIALS AND POLYNOMIAL OPERATIONS

Identify the elements of the single term:  $3x^6y^4$

Coefficient:

Variables:

Exponents:

	# of Terms	Type
1 term	$3x^6y^4$	Monomial (1)
2 terms	$2x^5 - 6y^2$	Binomial (2)
3 terms	$6x^2 - 5x + 12$	Trinomial (3)
Any more than 3 terms $4x^5 + 6x^3 - 2x + 7$		Polynomial (many)

### RULES FOR POLYNOMIALS

- No variables in the denominator.
- No variables in the exponent.
- No variables in a radical.
- No variables in absolute value symbols.
- ✓ All variables must have positive whole number exponents.

### NOT A POLYNOMIAL

$$\frac{3}{x} - x$$

$$5x^n \text{ or } 6x^{5y}$$

$$\sqrt{2x} + 7$$

$$|5x^2 - 2x + 1|$$

$$2x^{\frac{1}{3}} - x^{-1}$$

## FINDING THE DEGREE OF A POLYNOMIAL

To find the degree of a polynomial in a single variable, look for the greatest power.

1)  $3x^5 - 6x^3 + 4x - 8$

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

3)  $\frac{1}{2}x^5 + 5x^3 - 3x^6 + 2$

### Polynomials with Multiple Variables

4)  $4x^3y^5 - 7x^2y + 9xy^6$

If you have a polynomial with more than one variable, find the sum of the exponents of each term.

### Polynomials in Factored Form

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

In factored form, add all exponents in the polynomial.

## OPERATIONS WITH POLYNOMIALS (+, -, ×, ÷)

To add or subtract any polynomial, combine all \_\_\_\_\_.

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

Perform the Indicated Operation.

1)  $2(5x^3 + 2x^2 - 4x + 1) + 3(3x^2 - 9x - 8)$

2)  $3(2x^4 - 5x^2 + 3x - 4) - 2(4x^3 + 8x^2 - 6x + 7)$

3)  $4(5x^3 - 6x^2 - 3x + 2) - 6(-2x^3 + 4x^2 - 3x + 10)$

## MULTIPLYING POLYNOMIALS

**“F.O.I.L.”**

$$(x+7)(3x-8)$$

**Distributive Property**

$$(x+7)(3x-8)$$

**The box method**

$$(x+7)(3x-8)$$


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


## SPECIAL PRODUCT RULES

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

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

Example

$$(2x - 5y)^2$$

An alternate way to do this:

$$(2x - 5y)^2$$

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

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


Here are some advance problems, find the product of each:

1)  $(3x^2y - 5z)^2$

2)  $(4x^3 + 12y^2)^2$

3)  $(\sqrt{2x-1} + 3)^2$

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

5)  $(3x^n - 4)^2$

6)  $2(5x^{3n} + 2y)^2$