

Objectives:

- At the end of class you should know important vocabulary of polynomials.
- You should know how to add, subtract, and multiply polynomials.

Vocabulary:

- **Polynomial:** Many terms
- **Term:** Separated by + or - signs
- **Coefficient:** # attached to a variable
- **Constant:** # without a variable
- **Standard form:** terms written in order of descending powers
- **Degree:** highest power on a variable
- **Leading coefficient:** # attached to highest powered variable
- **Two ways to name a polynomial**

Ex. $5 + 4x^2 + 2x^3$
$5, 4x^2, 2x^3$
4 and 2
5
$2x^3 + 4x^2 + 5$
3
2 (x^3)
3 rd degree polynomial

$y = x$
 $y = x + 4$
 $y = x^2 + 4x + 9$

# of Terms	Name of polynomial
1	Monomial
2	Binomial
3	Trinomial
4+	Polynomial w/ four terms

Etc.

Degree of leading coefficient	Name of polynomial
0	Constant
1	Linear
2	Quadratic
3	Cubic
4+	4 th Degree

Etc.

OR
 polynomial w/ 3 terms
 $y = x + 5$
 $y = x^2 + 4x + 9$
 $y = 2x^3 + 4x^2 + 5$

Example 1: Put the polynomial in standard form. Identify the number of terms, the degree, the leading coefficient and name the polynomial.

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

Standard Form: $4x^5 + 2x^3 + 3x - 4$

of Terms: 4

Degree: 5

Leading Coefficient: 4 (x^5)

Name: 5th degree polynomial OR polynomial w/ 4 terms

Example 2: Simplify by adding the polynomials. (You can only combine like terms)

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

$2x^3 + 4x^2 + 5 - 3x^3 + 8x^2 - 7$

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

Example 3: Simplify by subtracting the polynomials

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

$$\underline{2x^3} + \underline{4x^2} + \underline{5} + \underline{3x^3} - \underline{8x^2} + \underline{7}$$

$$\boxed{5x^3 - 4x^2 + 12}$$

Example Set 4: Multiply: The Distributive Property.

1.

$$6(n + 7)$$

$$= 6(n) + 6(7)$$

$$= \boxed{6n + 42}$$

2.

$$5x^2(x - 7)$$

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

$$\boxed{5x^3 - 35x^2}$$

Example 5: Multiply: Understanding Distribution

1.

$$(4a - 4)(a + 8)$$

$$(4a)(a) + (4a)(8) + (-4)(a) + (-4)(8)$$

$$4a^2 + 32a - 4a - 32$$

$$\boxed{4a^2 + 28a - 32}$$

2.

$$(4a - 4)(a + 8)$$

$$= a(4a - 4) + 8(4a - 4)$$

$$4a^2 - 4a + 32a - 32$$

$$\boxed{4a^2 + 28a - 32}$$

Example Set 6: More complex multiplication of polynomials

1.

$$(5y + 1)^2$$

$$= (5y + 1)(5y + 1)$$

$$= 5y(5y + 1) + 1(5y + 1)$$

$$= 25y^2 + 5y + 5y + 1$$

$$= \boxed{25y^2 + 10y + 1}$$

2.

$$(4p + 3)(7p^2 - 3p - 8)$$

$$\underline{28p^3} - \underline{12p^2} - \underline{32p} + \underline{21p^2} - \underline{9p} - \underline{24}$$

$$\boxed{28p^3 + 9p^2 - 41p - 24}$$

6.1 - In Class Assignment

Date _____ Period _____

Put in standard form (if needed). Identify the Leading Coefficient. Name each polynomial by degree and number of terms.

1) $-m$

2) $-10x^2 - 5 + 8x$

Std form: $-10x^2 + 8x - 5$

L. Coeff: -10

Name: 2nd degree polynomial
OR Quadratic or polynomial with
OR Trinomial **3** terms

3) $-10n^2 + 8n^6 - 1 - n + 5n^3$

$8n^6 + 5n^3 - 10n^2 - n - 1$

Leading coeff: 8

Name: 6th degree polynomial
polynomial w/ 5 terms

4) $10b^3 + 8b^2 + 9b$

L. coeff: 10

Name: 3rd degree polynomial (cubic)
Trinomial

Simplify each expression and put in standard form.

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

$-11x^4 - 2$

6) $(-5n - n^4) - (8n^4 - 7n)$

$-5n - n^4 - 8n^4 + 7n$

$-9n^4 + 2n$

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

$2x^4 - 5x^2 + 6x^2 + 2x^4 - x^3$

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

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

$4n^2 - 2n^3 + 5n - 3n^2 + 2n + 5n^4$

$5n^4 - 2n^3 + n^2 + 7n$

9) $(8 + 5a + a^2 - 7a^4) - (2a - 7a^2 - 6 - 3a^4) - (2a^2 + 5)$

$8 + 5a + a^2 - 7a^4 - 2a + 7a^2 + 6 + 3a^4 - 2a^2 - 5$

$-4a^4 + 6a^2 + 3a + 9$

Find each product.

10) $4m^3(3m + 2)$

$$12m^4 + 8m^3$$

12) $(2r + 2)(r + 8)$

$$2r^3 + 18r + 16$$

14) $(2a + 2b)(2a - 2b)$

16) $(2b - 7)^2$

18) $(4x + 3)(x^2 - 4x + 3)$

11) $(5b - 4)(4b + 6)$

13) $(8 + m)(8 - m)$

$$64 - m^2 \text{ OR } -m^2 + 64$$

15) $(6x + 7y)(6x - 7y)$

17) $(x - 4y)^2$

$$(x - 4y)(x - 4y)$$

$$x^2 - 4xy - 4xy + 16y^2$$

$$x^2 - 8xy + 16y^2$$

19) $(6a - 5)(a^2 + 2a - 8)$