

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Notes

Algebra Section 9.1

Pages 554-559



**Goal:** “You will add and subtract polynomials”

**Vocabulary**

**Monomial:** a number, variable, or the product of a number and one or more variable with whole number exponents.

**Degree of a Monomial:** The sum of the exponents of the variables in the monomial.

Monomial	Degree
10	0
3x	1
$\frac{1}{2}ab^2$	1+2=3
$-1.8m^5$	5

Not a Monomial	Reason
$5 + x$	It has +
$\frac{2}{n}$	Variable in demonminator- negative exponent
$4^a$	Variable in exponent
$x^{-1}$	Negative exponent

**Ex:** Monomial? Yes or no? Why? Why not? If yes, what is the degree?

a. 17

**yes**  
**a number**  
**degree=0**

b.  $\frac{x^3}{2}$

**yes**  
**product**  
**degree=3**

c.  $\frac{5}{x}$

**no**  
**negative exponent**

d.  $4x^2y^5z$

**yes**  
**product**  
**degree=8**

e.  $9 + x$

**no**  
**sum**

f.  $7^b$

**no**  
**variable as exponent**

g.  $y^{-3}$

**no**  
**negative exponent**

h.  $\frac{3}{4}ab$

**yes**  
**product**  
**degree=2**

**Polynomial:** a monomial or a sum of monomials. Each is called a term.

**Binomial:** A polynomial with two terms.

**Trinomial:** A polynomial with three terms.

**Degree of a Polynomial:** The greatest degree of its terms.

**Parts of a polynomial:** Note- the polynomial is written so that the exponents of a variable decrease from left to right.

A diagram showing the polynomial  $2x^3 + x^2 - 5x + 12$ . Three blue arrows point to specific parts of the polynomial: one from the left to the coefficient '2', one from above to the exponent '3', and one from the right to the constant '12'.

**Rewrite a polynomial:**

Rewrite the polynomial so that the exponents of a variable decrease from left to right. Then state the leading coefficient, degree, and constant.

$$15x - x^3 + 3$$

$$-x^3 + 15x + 3$$

When more than one variable is used, polynomials should be written in descending order, based on the variable that comes first alphabetically.

$$4ab^3 + 2a^3b - 5a^2b^4$$

$$2a^3b - 5a^2b^4 + 4ab^3$$

**Rewrite the following polynomials in descending order, based on the variable that comes first alphabetically.**

1.  $15x - x^3 + 3$

$$-x^3 + 15x + 3$$

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

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

3.  $-3ac^4 + a^2c^2 - a^3c$

$$-a^3c + a^2c^2 - 3ac^4$$

4.  $3b^3 - 4b^4 + b^2$

$$-4b^4 + 3b^3 + b^2$$

5.  $7x^2y + 4xy^3 - 3x^3y^2$

$$-3x^3y^2 + 7x^2y + 4xy^3$$

**Ex:** Classify each polynomial as a monomial, binomial, trinomial or polynomial, then find the degree of each.

1.  $2 + 4x - 7x^2$

**Trinomial**  
**Degree=2**

2.  $5xy^2$

**Monomial**  
**Degree=3**

3.  $6a^2c + 5ac^5$

**Binomial**  
**Degree=6**

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

**Polynomial**  
**Degree=3**

5.  $7b^3c + 4bc^4$

**Binomial**  
**Degree=5**

6.  $6n^4 + 3n + 7x^8 - 4n^3$

**Polynomial**  
**Degree=8**

**Adding Polynomials** - Same as adding like terms.

**Ex:**  $(2x^3 - 5x^2 + x) + (2x^2 + x^3 - 1)$

$$3x^3 - 3x^2 + x - 1$$

**Ex:**  $(3x^2 + x - 6) + (x^2 + 4x + 10)$

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

**Ex:**  $(-2x^2 + 3x - x^3) + (3x^2 + x^3 - 12)$

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

**Ex:**  $(4x^3 + 2x^2 - 4) + (x^3 - 3x^2 + x)$

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

**Subtracting Polynomials** - Distribute the negative first.

**Ex:**  $(4n^2 + 5) - (-2n^2 + 2n - 4)$

$$6n^2 - 2n + 9$$

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

$$x^2 - 2x + 13$$

**Ex:**  $(2c^2 - 8) - (3c^2 - 4c + 1)$

$$-c^2 + 4c - 9$$

**Ex:**  $(5y^2 + 2y - 4) - (-y^2 + 4y - 3)$

$$6y^2 - 2y - 1$$

**\*CHALLENGE\***

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

$$3x^3y + 9x^2y^2 - 3xy^3 + 2x + 5y$$