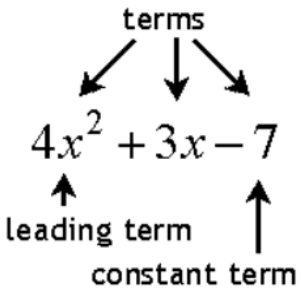
Algebra 1 Unit 4: Radicals and Polynomials Notes

Day 5 – Classifying & Adding/Subtracting Polynomials

A **POLYNOMIAL** is a mathematical expression consisting of terms, which can include a constant, variable, or product of a constant and variable, that are connected together using addition or subtraction. Variables must have exponents raised to whole number exponents.



Number of Terms: 3

Terms: $4x^2$, $3x$, -7

Coefficient(s): 4, 3

Constant(s): -7

Polynomials CANNOT contain:

- Radicals
- Fractional exponents
- Negative exponents
- No variables in the denominator

Cross off all expressions that are NOT polynomials:

$-8x^5 + 2x - 7$ $6x^{-2} - 3x$ $\frac{1}{x^3}$ $3x^4 - \sqrt{x}$ $-9 + x$ $4x^2$

Polynomials are typically written in **STANDARD FORM**, which means the terms are arranged in decreasing order from the largest exponent to the smallest exponent. When you write polynomials in standard form, you can easily identify the degree of the polynomial. The **DEGREE** is the largest exponent of the variable in the polynomial.

Rewrite each polynomial in standard form. Then identify the degree of the polynomial:

a. $5x - 6x^2 - 4$

Standard Form: $-6x^2 + 5x - 4$

Degree: 2

b. $-7x + 8x^2 - 2 - 8x^2$

Standard Form: $-7x - 2$

Degree: 1

c. $6(x - 1) - 4(3x^2) - x^2$

Standard Form: $6x - 6 - 12x^2 - x^2$, $-13x^2 + 6x - 6$

Degree: 2

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Classifying Polynomials

Polynomials are classified by **DEGREE** and **NUMBER OF TERMS**:

Degree

# of terms

Degree	Name	Example
0	constant	6
1	linear	6x
2	quadratic	$6x^2$

Terms	Name	Example
1	monomial	x
2	binomial	x + 5
3	trinomial	$3x^2 + x + 5$

Complete the table below. Simplify the expressions or put in standard form if necessary.

Polynomial	Leading Coefficient	Degree	# of Terms	Classification
8x				
$x^2 - 4$				
10				
$-24 + 3x - x^2$				
$5x^2 - 12 + 8$				
$7x - 9x + 1$				

Introduction to Polynomial Operations

Adding polynomials is essentially combining like terms. Review what it means to combine like terms.

Circle all terms that can be combined with 3a.	*Draw a square around all terms that can be combined with 4b.*	*Underline all terms that can be combined with a^2.*	*Draw an X through all terms that can be combined with 5.*

14a	5ab	3b	$3a^2$	Sum of 'a' terms:
$4b^2$	17	-100	14ab	Sum of 'b' terms:
$5a^2$	-4a	16b	$73a^2$	Sum of 'a^2' terms:
				Sum of constants:

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Adding Polynomials

When adding, use the following steps to add polynomials:

- Put polynomials in standard form.
- Line up the like terms
- Add
- Make sure final answer is in standard form

a. $(4x^2 + 2x + 8) + (8x^2 + 3x + 1)$

$4x^2 + 2x + 8$
$+ \ 8x^2 + 3x + 1$

$12x^2 + 5x + 9$

b. $(-2x + 5) + (-4x^2 + 6x + 9)$

$-2x + 5$
$+ \ -4x^2 + 6x + 9$

$-4x^2 + 4x + 14$

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

$19 - 6x + 4x^2$

$4x^2 - 6x + 19$

d. $(2x^2 + x - 5) + (x + x^2)$

$3x^2 + 2x - 5$

Application: Find an expression that represents the perimeter of the house.

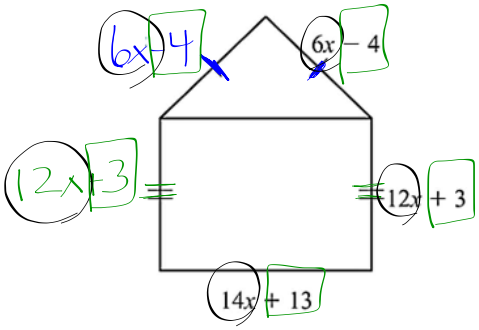
What does it mean to find the perimeter of an object?

add all outsides

Perimeter of the house:

$6x - 4$
$6x - 4$
$12x + 3$
$12x + 3$
$14x + 13$

$50x + 11$



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Subtracting Polynomials

Subtracting polynomials is similar to adding polynomials except we have to take care of the minus sign first. Subtracting polynomials require the following steps:

- Put each polynomial in standard form and combine like terms if possible.
- Change the subtraction sign to an addition sign and place a negative sign in front of the second polynomial.
- Distribute the minus sign to the second polynomial only - do not change anything with the first polynomial.
  Distributing the minus sign to the second polynomial changes the sign of every term to the opposite of what it originally was.
- Line up the like terms and add.
- Make sure polynomial is in standard form.

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

b. $(3x^2 + 5x) - (4x^2 + 7x - 1)$

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

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

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

$7 - 4x + x^2$

$x^2 - 4x + 7$

e. $(8x + x^2 - 6) - (-10x + 7 - 2x^2)$

$8x + x^2 - 6 + 10x - 7 + 2x^2$

$3x^2 + 18x - 13$

f. $(-7x^2 + 8x - 4) - (2 - 14x^2)$