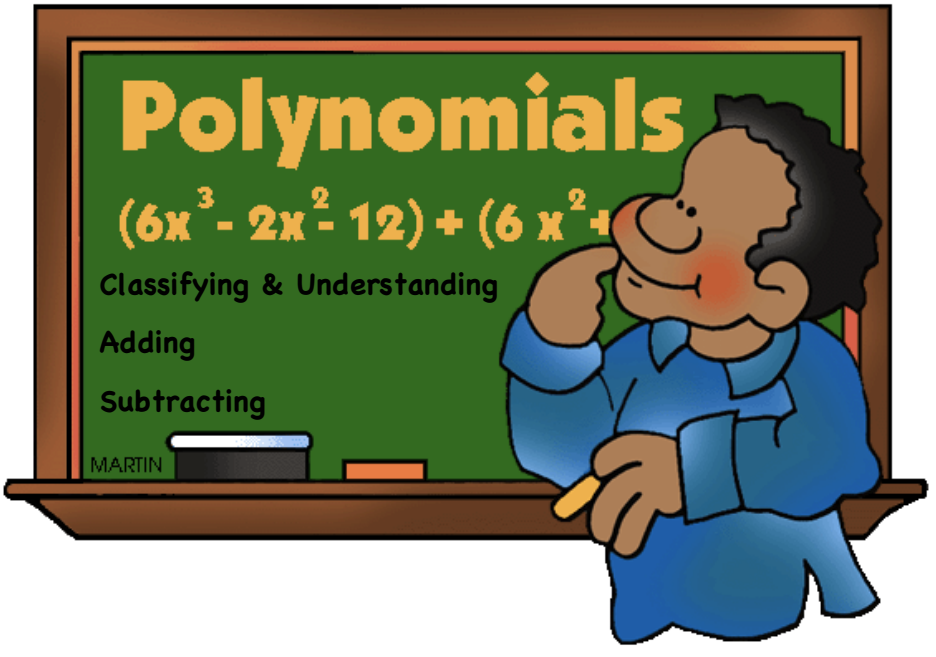
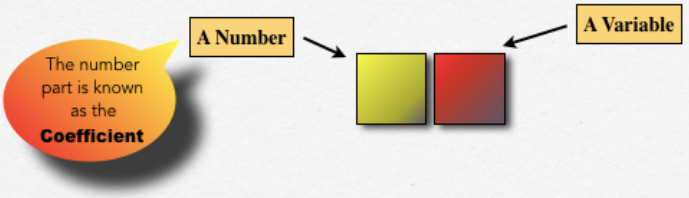
SEMINAR NOTES

Learning Guide 9



What is a Polynomials?

A polynomial is a big concept in algebra. First we have to understand what terms are. Terms are mathematical expressions made up of two parts.



Ex. x^2+2x+3

Ex. $6+3y-7y^2$

Try: What are the coefficient, variable and constant in each.

a) $6x^2+3x-5$ b) $-b^2-8b+1$ c) $3a^3b^2+2c$

What is a Polynomials?

A polynomial is an expression consisting of variables and coefficients, that have non-negative integer exponents of variables.
An example of a *polynomial* , x, is $x^2 + 4x - 5$.

Ex. A monomial is a one-termed polynomial.

$3x$, $2x^2$ *and* $-7xy^2$

Ex. A binomial is a two-termed polynomial.

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

Ex. A trinomial is a three-termed polynomial.

x^2+2x+3 *and* $6+3y-7y^2$

Try: $3x + 5$ $3\sqrt{n} - 2$ $\frac{1}{2}b + 5$ $\frac{1}{a} + 2a - 1$

Classifying Polynomials by Number of Terms

Polynomials can be classified by the number of terms it has.

Ex. A monomial is a one-termed polynomial.

$3x$, $2x^2$ *and* $-7xy^2$ *are all monomials.*

Ex. A binomial is a two-termed polynomial.

$3x+5$ *and* x^2+5y *are both binomials.*

Ex. A trinomial is a three-termed polynomial.

x^2+2x+3 *and* $6+3y-7y^2$ *are both trinomials.*

Specific Names for Polynomials		
▪▪	monomial	(1)
▪▪ + ▪▪	binomial	(2)
▪▪ + ▪▪ + ▪▪	trinomial	(3)
▪▪ + ▪▪ + ▪▪ + ▪▪ ···	polynomial	(many)

Try:

Classify each of the following by type: (Monomial, binomial, trinomial)

$2x + 3$ $x^2 - 2x + 1$ $4x^2$ $5 - 2d$

Degree of a Monomial

The degree of a monomial is the sum of the exponents in the term.

Ex. What is the degree of the following monomial?

$4x^2y^3$

$2 + 3 = 5$

The degree of the monomial $4x^2y^3$ is 5.

Try: **Identify the degree of the following:**

$4x^2 - 3x + 1$ $\qquad$ $5x^3 + 4x$ $\qquad$ $3 + 4x^2 + 2x$

Degree of a Polynomial

The degree of a polynomial is the greatest degree in any one of the terms in the polynomial. Do not add the degrees between the terms.

- Find the degree of each term
- Take the highest degree of the terms.

Ex. What is the degree of the following polynomial?

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

The degree of the polynomial $4x^2y^3 + 2x^4y^2 + 5x^2y^2$ is 6.

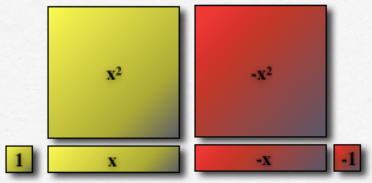
Try: $2x^2y^4 + 4xy^3 - 5x^4y^5$

Modelling Polynomials Using Algebra Tiles

One way to understand algebra is to use tiles.

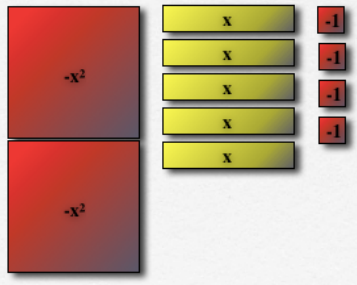
- Yellow is used to represent positive tiles.
- Red is used to represent negative tiles.

Ex. What do the tiles represent?



Ex. Use tiles to represent the following polynomial.

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



Try: Use tiles to represent the following:

$2x^2 + 4x - 1$ $\qquad$ $-x^2 - 2x + 3$

Using Tiles to Add Like Terms

Represent each term using the algebra tiles.

- Look for "like tiles" and gather together.
- Cancel opposites and add the remainder together.

Ex. Use tiles to add the like terms of the following expression:

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

Try: Write the polynomial expression for each under the tiles.

Adding Like Terms

Add only **"like terms"** (same variable and exponent).

- Add the coefficients.
- Rewrite the variables.

Ex. Add the like terms of the following expression:

$3a - 7b - 11a + 2b = -8a - 5b$

Add the like terms together.

I told you to add the like terms!

Try: **Simplify each polynomial.**

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

$3x^2 - 2y - 2x^2 + y$

$2xy - 2x^2 - 2yx + 2x^2$

Adding Polynomials

Watch for addition sign before a bracket.

- Ignore the parentheses if there is addition between them.
- Use addition rules to combine like terms.

Ex. Simplify the following expression.

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

Try: **Add the following polynomials.**

(6x + 1) + (2x – 5)

(-2x + 4) + (7x – 2)

(11x – 5) + (-3x – 7)

$(2x^2 + 5x – 7) + (-3x^2 – 4x + 3)$

$(-x^2 – 3x + 2) + (-2x^2 – x + 5)$

$(-4x^2 – 5x + 7) + (2x^2 + 3x – 8)$

$(3x^2 + 6x – 1) + (-2x^2 – 6x + 2)$

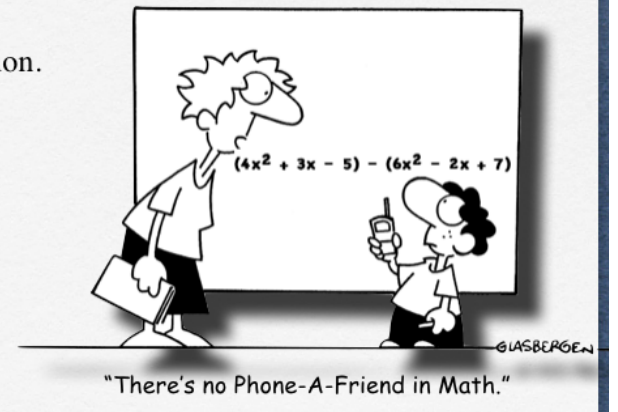
Subtracting Polynomials

Watch for subtraction sign before a bracket.

- Change the subtraction sign to addition.
- Change the sign of every sign in the bracket to its opposite.
- Use addition rules to combine like terms.

Ex. Simplify the following expression.

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



"There's no Phone-A-Friend in Math."

Try: **Subtract the following polynomials.**

$(6x + 1) - (2x - 5)$

$(-2x + 4) - (7x - 2)$

$(11x - 5) - (-3x - 7)$

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

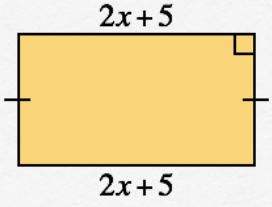
$(-x^2 - 3x + 2) - (-2x^2 - x + 5)$

Finding a Side Given the Perimeter

You need to subtract the known sides from the perimeter.

Ex. Find the missing dimension given the perimeter.

$P = 8x + 6$



Try: **Find the perimeter of each shape below:.**