

Tuesday

Name:

Polynomial Review

Warm up

In Algebra, a letter that represents one or more numbers is called a variable.

A number or product of a number with one or more variables which can be raised to a power is called a monomial.

A monomial is a number or variable or the product of a numbers and variables.

Examples: x^2 , $-3x^2y^3$, 2

The number part of a monomial is called the coefficient.

Example of Terms:

Polynomial

Term	Coefficients	Variables
$8ab^2 - 9x^6a^4 + xab - 9$	$8, -9, 1, 1$	a, x, b
$-\frac{1}{2}x^2a^4b$ monomial	$-\frac{1}{2}$	x, a, b

Expressions like $2x - b + 3c$, $4x^2 + 5$ or $\frac{2}{x} - 7$ are called _____.

Many algebraic expressions are called polynomials. A polynomial is

a term or terms where all the variables have whole number exponents

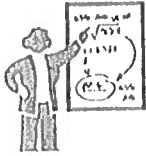
Example: $5, x, 3x, 8a+4b, 2x^2 - 4x + 5$ are all examples of polynomials but $\frac{4}{a} - 5$ is NOT a polynomial. (Note: a polynomial variable has whole number exponents, and the variable only appears in the numerator).

A polynomial consists of one or more terms (which are separated by '+' or '-' signs).

not polynomials
 $\frac{4}{a} - 5a$ $\frac{4}{a}$ or $a^{1/2}$



Class Ex. 2:



Complete the following table.

Polynomial Expression	Variables	# of terms	Terms	Name of Polynomial
$3a + 3xr$	a, x, r	2	$3a, 3xr$	binomial
$7a - 3b + 8x$	a, b, x	3	$7a, 3b, 8x$	trinomial
$5x$	x	1	$5x$	monomial
$\sqrt{3}x + 5$	x	2	$\sqrt{3}x, 5$	binomial
$3xa^2b - \frac{1}{2}x - 9a + 5$	x, a, b	4		polynomial

Degree of a Polynomial

All polynomials can be classified by degree.

Degree of a monomial: is the sum of the exponents of its variable(s)

Examples:

The degree of $\frac{1}{2}x^3$ is 3.

The degree of $4x^3a^3b$ is 7.

Degree of a polynomial: is the term with the highest degree.

Examples:

The degree of $3x^2 + 7x - 9$ is 2.

The degree of $8ab^2 - 9x^6a^4 + xab - 9$ is 10.

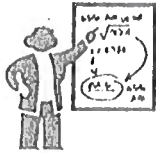
$\frac{3}{3}$ $\frac{10}{10}$ $\frac{3}{3}$ $\frac{0}{0}$

highest only ↑

A degree of a polynomial is based on the sum of the exponents of the variables. If there is no variable present this is called a constant. It has a degree of 0.

The constant term in the following polynomial $8x^2b - 5ac^3x^2 - y - 9$ is -9.

Class Ex. 3:



State the degree of the following:

a) $5xab^3$ 5

b) $3x^3 - 4x^2 + 9$ 3

c) $5x^4y^3 + 3xy^2$ 7

d) 9 0

e) $xya - 2x^2a - 4r^{10}$ 10

Polynomial with a single variable

Polynomials which contain a single variable are usually arranged in descending or ascending order of degree.

$x^2 + x + 1$ not $x + 1 + x^2$

The **Leading Term** is the term with the highest degree.

The **Leading Coefficient** of the polynomial with a single variable is the coefficient of the term with the highest degree.

Class Ex. 4:



In the following Polynomial expression $3x^3 - 2 + 2x^6 + 4x$

i) Write the following polynomial in descending power of x.

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

ii) Write the following polynomial in ascending power of x.

$-2 + 4x + 3x^3 + 2x^6$ (we don't like this)

iii) State the leading term and leading coefficient.

$2x^6$ 2

iv) State the constant.

-2

**Addition and Subtraction
of polynomials**

Monomial: a number, a variable, or a product of numbers and variables.

Examples: 2, 4a, 4a²b, 18x²yz¹⁰

Polynomial: 2x³ + 4ab + 10

Examples: _____

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

Always write polynomials in **DESCENDING ORDER**. This means from highest to lowest exponent, with the constant at the end!

Like Terms: same variable, same exponents

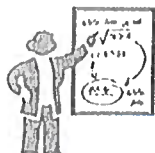
Example: 5xy, xy x², 1/2 x²

Unlike terms: _____

Example: 5x²y, xy not

To SIMPLIFY polynomials group together the like terms and add or subtract the coefficients!

Class Ex. 5:



Simplify

a) $3x + 5a - 6x - 3a$

$= -3x + 2a$

b) $x + 7 + 3x - 10$

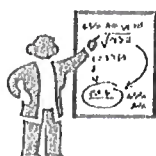
$4x - 3$

c) $-3x^3 - 2x + 5x^3 + 5x - 8$

$2x^3 + 3x - 8$

To ADD or SUBTRACT polynomials _____
 gather like terms.

Class Ex. 6:



Simplify:

a) $(3x - 5) + (2x + 8)$

$= 3x - 5 + 2x + 8$
 $= 5x + 3$

b) $(x - 5) - (3x + 8)$

$= x - 5 - 3x - 8$
 $= -2x - 13$

c) $(3a + b - 2c) + (4a - 2b + 8c)$

$3a + b - 2c + 4a - 2b + 8c$
 $= 7a - b + 6c$

d) $(2x + 4) + (3x - 2) - (5x + 8)$

$2x + 4 + 3x - 2 - 5x - 8$
 $0x - 6$
 $= -6$

o) $(4x^2 - 5x + 9)$

+ $(2x^2 - 8x + 3)$

$$6x^2 - 13x + 12$$

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

- $(7x^2 - 9x - 8)$

$$-2x^2 + 13x + 5$$