

Lesson 1

Polynomials: A Brief Introduction

The word *polynomial* is derived from two Greek words, *poly* (meaning “many”) and *nom* (meaning “name” or “term”.) In mathematics, we then use the word *polynomial* to mean an algebraic expression that has “many terms”.

Polynomials usually consist of as many as three parts, although not all three must be present for it to be a polynomial. You are probably already familiar with these parts from your previous work in algebra. The three parts of a polynomial are:

variables

constants

exponents

Variables are the unknown quantities, and are represented by a letter. Most often we use x and y , but we can use any letter.

Constants are numbers whose value is known. Constants can be integers, fractions, decimals, and either positive or negative. You will most often encounter positive and negative whole numbers for constants, but be prepared for any type of number. *In these lessons, constants will be integers that are added or subtracted.*

Exponents are always written in superscript (which is a smaller type above another another number). Exponents indicate the number of times to multiply the base number by itself. *For polynomial operations, we will only use positive whole numbers for our exponents. This is also true for exams like the GED[®] Test, COMPASS, and others.*

Other important words to know...

Quantity refers to a group of terms in a polynomial, and they are always be enclosed in parentheses.

Coefficient means the integer, fraction, or decimal that is a variable is multiplied by, and is always represented by writing that number directly in front of the variable. It will sort of look like it is “attached” to that variable.

Term refers to any set of numbers and variables separated by addition or subtraction. This can be a constant, a single variable, a variable with a coefficient, a variable with an exponent, or a variable with an exponent and a coefficient.

Note: the phrase “**like terms**” means terms that are the same.

Binomial refers to a special polynomial that has only an x -term and a constant

Examples:

$$5^3$$

5 is the base, 3 is the exponent

$$4x$$

4 is the coefficient, x is the variable

$$3x^2$$

3 is the coefficient, x is the variable, 2 is the exponent

$$2x + 3$$

2 and 3 are constants, x is the variable. *This is a binomial*

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

-5 and 3 are coefficients, 8 is the constant, x is the variable, and 2 is the exponent

$$(3x^2+4x+7) + (5x^2+6x+1)$$

This expressions has two quantities, $(3x^2+4x+7)$ and $(5x^2+6x+1)$, since they are both enclosed in parentheses.

It also has three pairs of like terms: $3x^2$ and $5x^2$, $4x$ and $6x$, 7 and 1.

Problem Set

Answer the questions below about about each polynomials.

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

How many different types of *terms* does this polynomial have? _____

What is the *coefficient* of the x term? _____

What is the *constant* of this polynomial? _____

What is the *coefficient* of the x^2 term? _____

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

How many total *terms* does this polynomial have? _____

How many different types of *terms* does this polynomial have? _____

List a pair of *like terms*: _____ and _____

List another pair of *like terms*: _____ and _____

Which term has three of the same *like terms*? _____

$$(6x^2 + x + 2) + (3x^2 + 2x + 4)$$

List each pair of *like terms*:

_____ and _____

_____ and _____

_____ and _____

What is the coefficient in the second quantity's x^2 term?

What is the coefficient in the first quantity's x term?

What are the constants in each polynomial quantity?

Consider the four polynomials below. *Circle the binomial.*

$7x^2 + 2x + 4$

$4x^2 + 2x + 3$

$2x^2 + 8x$

$8x + 4$

A student sees the following expression:

$$(3x^2 + 4x + 7) + (5x^2 + 6x + 1)$$

The student then says “There are two terms in this expression.”

Is the student correct? Why or why not? Write your response below.
