

Introduction to Polynomials and Polynomial Functions

Polynomials

A number or a number multiplied by variables is called a _____ (also called a _____).

Ex 1.

Which of the following are monomials?

$$-4x^2 \quad 5x^2 + 3x \quad 2x^4y^5 \quad \frac{4}{x} \quad 17$$

The sum of the exponents of the variables is called the _____ of a monomial.

The numerical factor in a monomial is called the _____.

Ex 2.

What are the degrees and coefficients of the following monomials?

Monomial	Degree	Coefficient
$-4x^2$		
$5x^2y^4z^7$		
$2x^3y$		
$\frac{x}{4}$		
ab		
$-z$		
17		

One or more monomials added together is called a _____.

ex: $-3x^2y^3 + 2x^4 - 3xy + 24$

The highest degree of all terms in a polynomial is called the _____ of the polynomial.

ex: What is degree of above polynomial?

A polynomial with 2 terms is called a _____.

A polynomial with 3 terms is called a _____.

Ex 3.

Add: $(-3x^2y^3 + 2x^4 - 3x^3y^2 + 24) + (2x^2y^3 - 2x^4 + 5x^3y^2 + 6x - 4)$

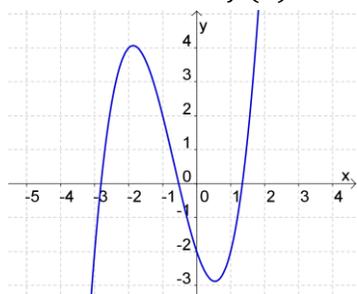
Ex 4.

Subtract: $(6x^2y^5 - 2xy^3 - 8) - (-7x^2y^5 - 4xy^3 + 2)$

Polynomial Functions

Here's a **polynomial function**: $f(x) = x^3 + 2x^2 - 3x - 2$

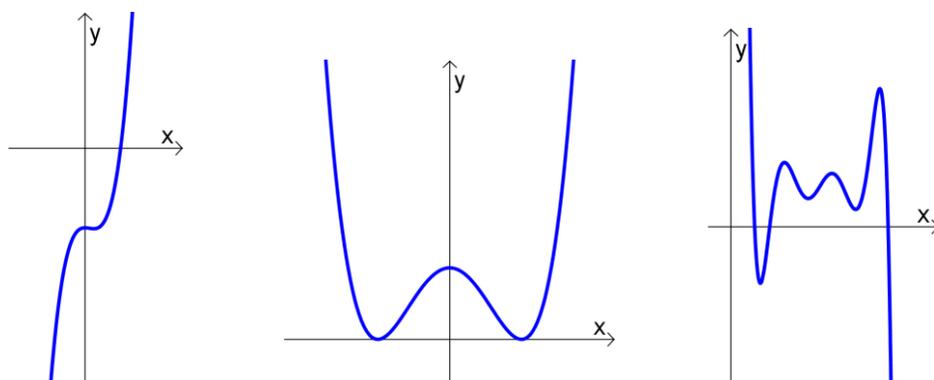
And here's what $f(x)$ looks like:



In general, polynomial functions are _____ (i.e. only have rounded curves with no sharp corners) and _____ (i.e. don't have breaks and can be drawn without lifting pencil).

Also, polynomial functions always either rise or fall as you go to the left or right (except for constant functions). This is called the **end behavior** of a function, and depends on the _____ (the term with _____ degree).

Examples of polynomial functions:



Ex 5.

Find the leading term and leading coefficient of the following polynomial functions.

$$f(x) = 7x^6 - 3x^3 - x$$

Leading term: _____ Leading coefficient: _____

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

Leading term: _____ Leading coefficient: _____

Practice

1. Determine the coefficient of each term, the degree of each term, the degree of the polynomial, the leading term, and the leading coefficient of the polynomial.

$$11x^3 - 6x^2 + x + 3$$

Term	Coefficient	Degree

Degree of the polynomial: _____

Leading term: _____

Leading coefficient: _____

2. Determine the coefficient of each term, the degree of each term, the degree of the polynomial, the leading term, and the leading coefficient of the polynomial.

$$12x^4y - 5x^3y^7 - x^2 + 4$$

Term	Coefficient	Degree

Degree of the polynomial: _____

Leading term: _____

Leading coefficient: _____

3. Subtract: $(5x^4y^2 + 6x^3y - 7y) - (3x^4y^2 - 5x^3y - 6y + 8x)$

Q: What holds water yet is full of holes?