

Classifying Polynomials

What does it mean to classify a polynomial?

To **classify** it, means to **name** it.

We, as mathematicians, look at the Degree and the number of Terms a polynomial has to classify it.

Degree - highest Exponent

Terms - # of items being added or subtracted

<u>Degree</u>		<u>Term</u>
0 - Constant	: 4	1 - monomial
1 - Linear	: $4x + 11$	2 - binomial
2 - Quadratic	: $x^2 + 1$	3 - Trinomial
3 - Cubic	: $x^3 + 5x - 11$	4 or more - Polynomial
4 - Quartic	: x^4	
5 - Quintic	: x^5	

Classifying Polynomials

Let's get some practice with this.

Classify the following Polynomial

Ex. $2x + 1$

Degree: 1 Terms: 2

Classify: Linear Binomial

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Classify the following Polynomial

Ex. $x^2 - 9$

Degree: 2 Terms: 2

Classify: Quadratic Binomial

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Classify the following Polynomial

Ex. $3x^3$

Degree: 3 Terms: 1

Classify: Cubic Monomial

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Classify the following Polynomial

Ex. $11x^4 + x^2 + 4x^5 - 8$

Degree: 5 Terms: 4

Classify: Quintic Polynomial

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Classify the following Polynomial

Ex. $2x^3 + x^4 - 62$

Degree: 4 Terms: 3

Classify: Quartic Trinomial

Classifying Polynomials

Recap:

What two pieces of information do mathematicians, like you, use to classify polynomials? *Degree and term*

How do you determine this information?

Degree → highest exponent *Term* → number of items being added or subtracted

Classify the following polynomial:

$$3x^5 + 2x^3 - 4x + 11$$

Quintic Polynomial

Add and subtract polynomials ✓

Ex. $(2x^2 - x + 9) + (5x^2 + 7x + 4)$

$$\underline{7x^2 + 6x + 13}$$

Simplify

Ex. $(2x^3 - x + 9) - (x^3 + 5x^2 + 7x + 4)$ ✓

$$\boxed{x^3} + \boxed{5x^2} - \boxed{8x} + \boxed{5}$$

Simplify

Ex. $(x^3 - x + 9) - (3x^3 + 5x^2 + 3x - 11)$ ✓

$$-2x^3 - 5x^2 - 4x + 20$$

Multiply Polynomials

Ex. $(2x-2)(3x+5)$ ✓

$$\begin{array}{r} 6x^2 + 10x - 6x - 10 \\ \hline 6x^2 + 4x - 10 \end{array}$$

Simplify

Ex. $(x-2)(x^2-5x+4)$ -

$$\begin{array}{r} x^3 - 5x^2 + 4x - 2x^2 + 10x - 8 \\ \hline x^3 - 7x^2 + 14x - 8 \end{array}$$

Recap

Simplify the following expressions then classify them.

1. $(11x^2 + 6x - 13) + (4x^3 - 7x^2 - 3)$

$4x^3 + 4x^2 + 6x - 16$ Cubic Polynomial

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

$3x^2 + 2x - 24x - 16$

$3x^2 - 22x - 16$

Quadratic Trinomial