

Introduction to Polynomials

Introduction to  
Polynomials

What are polynomials?

quadratic

+ Adding +

- Subtracting -

# number of terms Types of Polynomials

monomial:

① Monomial	$6x$ $7y$ $-9x^3yz^5$
② Binomial	$x-9$ $7x^2+5x$
③ Trinomial	$9x^2-5x+2$
④ Polynomial	$-8x^4+5x^3+6x^2-8x+1$

1 #, 1 variable, or product of a number & 1 or more variables

separated by + or -

## Non-Examples

$8^x$	$\frac{4}{x}$	$x^{-3}$
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variables must have positive exponents

## Vocabulary

$$5x^3 + x^2 - 7x + 9$$

cubic polynomial

\* Polynomial is a monomial or the sum or difference of 2 or more monomials. A polynomial is made up of terms, which are algebraic expressions, combined by addition or subtraction.

## Examples:

exponent  $7xy^2$   
add for mono.  
Degree: 3  
Leading Coefficient: 7  
Constant: 0

$5x^2 + 4x$   
look for highest degree  
Degree: 2  
quadratic  
Leading Coefficient: 5  
Constant: 0

$-8x^3 + 2x^2 - 8x - 5$   
look for highest  
Degree: 3  
cubic  
Leading Coefficient: -8  
Constant: -5

$-x^3 + 6x + 4$  decreasing exponents  
exponent for polys. degree  
Degree: 3  
cubic  
Leading Coefficient: -1  
Constant: 4

\* Standard form of a polynomial means that the degrees of its monomial terms decrease from left to right. (must do this!st)

# What are polynomials?

quadratic + Adding +

- Subtracting -

<u>degree</u>	<u>Types of Polynomials</u>	<u>ex</u>
0	constant	$-6$
1	linear	$-2x$
2	quadratic	$x^2$
3	cubic	$7x^3$
4	quartic	$\frac{1}{2}x^4$
5	quintic	$x^5$

Find the sum.

①  $(-2x - 9) + (x + 4)$

$$\begin{array}{r} -2x - 9 \\ + \quad x + 4 \\ \hline -x - 5 \end{array}$$

linear binomial

②  $(-5x + 17) + (-9x + 4)$

$$-5x + (-9x) + 17 + 4$$

$$-14x + 21 \text{ linear binomial}$$

③  $(3x^2 - 2x + 1) + (6x^2 + 3x)$

$$\begin{array}{r} 3x^2 - 2x + 1 \\ + 6x^2 + 3x \\ \hline 9x^2 + x + 1 \end{array}$$

quadratic trinomial

④  $(6x^3 - 12x + 1) + (8x^2 + 10x - 6)$

$$\begin{array}{r} 6x^3 \quad \quad -12x + 1 \\ + 8x^2 + 10x - 6 \\ \hline 6x^3 + 8x^2 - 2x - 5 \end{array}$$

cubic polynomial

distribute

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

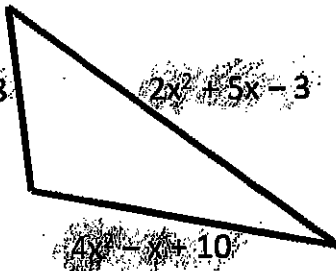
$$\begin{array}{r} 20x^3 - 10x^2 \quad \quad + 5 \\ + 21x^2 - 15x - 12 \\ \hline 20x^3 + 11x^2 - 15x - 7 \end{array}$$

$$20x^3 + 11x^2 - 15x - 7$$

cubic polynomial

Find the perimeter of each figure below.

⑥



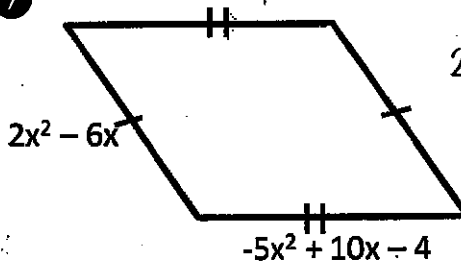
$$11x + 8 + 2x + 5x - 3 + 4x - 7 + 10$$

$$5x^2 + 15x + 15$$

quadratic trinomial

+ Adding +

⑦



$$2(-5x^2 + 10x - 4) + 2(2x^2 - 6x)$$

$$-10x^2 + 20x - 8$$

$$+ 4x^2 - 12x$$

$$\hline -6x^2 + 8x - 8$$

quadratic trinomial

Find the difference

①  $(7x + 10) - (3x - 8)$

$$\begin{array}{r} 7x + 10 \\ + -3x + 8 \\ \hline \end{array}$$

$4x + 18$  linear binomial

②  $(-14x + 3) - (2x + 9)$

~~$11x + 3 + 2x - 5$~~

~~$11x - 2$~~  linear binomial

③  $(5x^2 + 3x + 8) - (2x^2 - 2x - 9)$

$$\begin{array}{r} 5x^2 + 3x + 8 \\ + -2x^2 + 2x + 9 \\ \hline \end{array}$$

$3x^2 + 5x + 17$  quadratic trinomial

distribute -1 to terms in my second polynomial or add a line change the sign (add to opposite) to 2nd polynomial

④  $(4x^3 + x^2 - 9x - 8) - (7x^3 - 2x - 6)$

$$\begin{array}{r} 4x^3 + x^2 - 9x - 8 \\ + -7x^3 \quad -2x - 6 \\ \hline -3x^3 + x^2 - 11x + 14 \end{array}$$

cubic polynomial

distribute

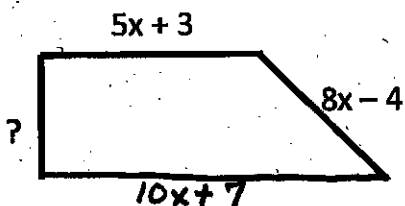
⑤  $-7(2x^4 + 3x^3 + x - 1) - (5x^4 - 21x^3 - 7x + 7)$

$$\begin{array}{r} -14x^4 - 21x^3 - 7x + 7 \\ + 1 \quad + 15x^3 - 20x^2 - 40x + 30 \\ \hline \end{array}$$

$$-14x^4 - 6x^3 - 20x^2 - 47x + 37$$

quartic polynomial

⑥ If the perimeter of the quadrilateral shown below is  $29x + 5$ , what is the length of the missing side?



$$29x + 5 = ? + 5x + 8x + 10x$$

$$29x + 5 = 23x + 6 + ?$$

$$6x + 5 = 6 + ?$$

$$6x - 1 = ?$$