Introduction to Polynomials

What are polynomials?

quadratic trinomial

+ Adding +

linear binomial

- Subtracting -

number of terms

Types of Polynomials

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

1 #, 1 variable, 1 produc

separated by + or −

Non-Examples

8^x $\quad \frac{4}{x}$ $\quad x^{-3}$

variables must have positive exponents

Vocabulary

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

cubic polynomial

Examples:

$-x^3+6x+4$ decreasing exponents

add for mono. look for highest exponent for polys.

$7xy^2$	$5x^2 + 4x$	$-8x^3 + 2x^2 - 8x - 5$	$6x - x^3 + 4$
Degree: 3	Degree: 2	Degree: 3	Degree: 3
Leading Coefficient: 7	Leading Coefficient: 5	Leading Coefficient: −8	Leading Coefficient: −1
Constant: 0	Constant: 0	Constant: −5	Constant: 4

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degree	Types of Polynomials	ex
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. $(-5x + 17) + (-9x + 4)$

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

$-14x + 21$ 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. $(6x^3 - 12x + 1) + (8x^2 + 10x - 6)$

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

cubic polynomial

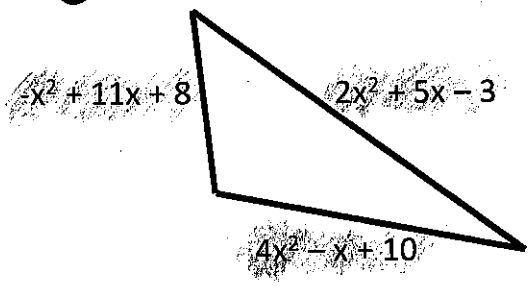
5. $5(4x^3 - 2x^2 + 1) + 3(7x^2 - 5x - 4)$

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

cubic polynomial

Find the perimeter of each figure below.

6.

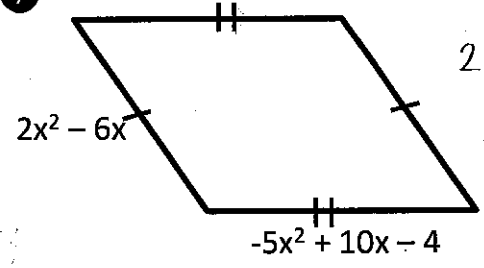


$-x^2 + 2x^2 + 4x^2 + 11x + 5x - x + 8 - 3 + 10$

$5x^2 + 15x + 15$

quadratic trinomial

7.



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

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

$+4x^2 - 12x$

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

quadratic trinomial

+ Adding +

linear binomial

Find the difference.

distribute -1 to terms in my second polynomial

1. $(7x + 10) - (3x - 8)$

$$\begin{array}{r} 7x + 10 \\ -3x + 8 \\ \hline 4x + 18 \end{array}$$

linear binomial

2. $(-14x + 3) - (-2x + 5)$ $-14x + 3 + 2x - 5$

$-12x - 2$ linear binomial

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

$$\begin{array}{r} 5x^2 + 3x + 8 \\ -2x^2 + 2x + 9 \\ \hline 3x^2 + 5x + 17 \end{array}$$

quadratic trinomial

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

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

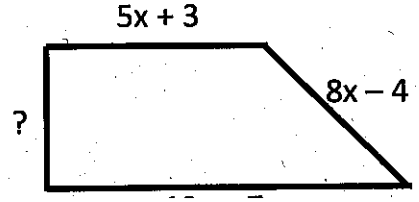
cubic polynomial

5. $-7(2x^4 + 3x^3 + x - 1) - 5(3x^3 + 4x^2 + 8x - 6)$

$$\begin{array}{r} -14x^4 - 21x^3 \quad\quad - 7x + 7 \\ +15x^3 - 20x^2 - 40x + 30 \\ \hline -14x^4 - 6x^3 - 20x^2 - 47x + 37 \end{array}$$

quartic polynomial

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



$29x + 5 = ? + 5x + 3 + 8x - 4 + 10x - 7$

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

$-23x - 6 \quad\quad -23x - 6$

$6x - 1 = ?$

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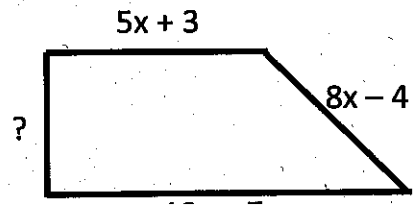

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