

Warm Up: Simplify if possible

$$3^2 \cdot 3^3$$

$$3^5$$

$$243$$

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

$$5x^2 - x$$

$$(5x + 2x^2)^4$$

Polynomials

Polynomials are expressions with one or multiple terms written in **standard form**, where the terms are placed in descending order, from largest **degree** to smallest **degree**. It looks like this:

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

degrees

← constant

↑ leading coefficient

Degree: **exponent of the variable**

Degree of a polynomial: **largest degree (exponent) it has**

Leading Coefficient: **coefficient of 1st term**

Write in standard form: $-4x^2+3+x^3$

Standard form: x^3-4x^2+3

Leading coefficient: 1 Degree: 3

Polynomials named by term:

One term: **MONOMIAL** ($5x$)

Two terms: **binomial** ($4x^2 + 2x$)

Three terms: **trinomial** ($2x^2 + x - 4$)

4+ terms: **polynomial**

Polynomials named by degree:

Degree of 0: **constant** (5) 

Degree of 1: **linear** ($3x + 2$) 

Degree of 2: **quadratic** ($4x^2 + 2x - 3$) 

Degree of 3: **cubic** ($3x^3 - 1$) 

Degree of 4: **quartic** ($x^4 + 2x^2 - 3$) 

Degree of 5+: **5th degree**

Complete the following chart to classify each polynomial.

| Polynomial | Degree | Classified by Degree | Classified by # of Terms |
|--|--------|----------------------|--------------------------|
| 6 | 0 | constant | MONOMIAL |
| -2x | 1 | linear | MONOMIAL |
| 3x + 1 | 1 | linear | binomial |
| * -x ² + 2x - 5 | 2 | quadratic | trinomial |
| 4x ³ - 8x | | cubic | binomial |
| 2x ⁴ - 7x ³ - 5x + 1 | | quartic | polynomial |

binomial

Answer the following for each polynomial:

- a. Standard form
- b. Degree
- c. Term classification
- d. Degree classification
- e. Leading coefficient

1. $4x-3x^2+7$

2. $8-2x^2$

3. $2x$

4. x^4-3+2x^2+5x

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

Adding Polynomials

We already know how to do this!! We just combine like terms.

But what about the parenthesis?

$$\underline{(5x^3 - x + 2x^2 + 7)} + \underline{(3x^2 + 7 - 4x)} + \underline{(4x^2 - 8 - x^3)}$$

$$x^3 = \underline{4} \quad x^2 = \underline{9} \quad x = \underline{-5} \quad \text{constant} = \underline{6}$$

$$\text{Standard form: } \underline{4x^3 + 9x^2 - 5x + 6}$$

Subtracting Polynomials

We follow the same steps as we do for adding except first we have to...

$$(-2x^3 + 5x^2 - x + 8) - (-2x^3 + 3x - 4)$$

Rewrite: $-2x^3 + 5x^2 - x + 8 + 2x^3 - 3x + 4$

$x^3 = \underline{0}$ $x^2 = \underline{5}$ $x = \underline{-4}$ constant = 12

Standard form: $\underline{5x^2 - 4x + 12}$

Pracitce: Write the sum of difference in standard form.

1. $(2x^2+x-5)+(x+x^2+6)$

$$3x^2+2x+1$$

quadratic
trinomial

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

$$-3x^2-7x-8$$

same

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

$$x^2-4x+7$$

same

You try!

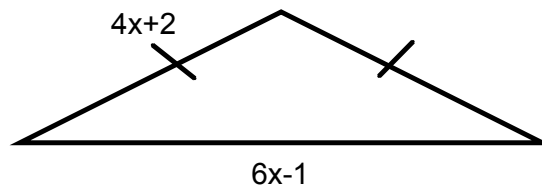
1. $(3x-6x^2+4)-(2-4x+6x^2)$

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

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

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

5. Find the perimeter of the triangle



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