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Algebra 1: Unit 3 Notes

Lesson 4: Polynomials

Part 1: *Naming Polynomials*

1. How are $2x + 7$ and $2x^2 + 7$ alike? How are they different?

   $2x + 7$ ↑ No x — $2x^2 + 7$ ↑ x^2 — -2 Terms

2. How are $2x + 7$ and $3x^2 + 2x + 7$ alike? How are they different?

   $2x + 7$: 2 Terms — $3x^2 + 2x + 7$: 3 Terms

These expressions are all Polynomials. The differences between them are ...

- The Number of Terms
- Type of Exponents

POLYNOMIALS

The Type of Polynomial Depends on

Number of Terms — Degree

How Many Terms are being added?

Monomial : one term

$4x$

Binomial : two terms

$4x + 7$ ← Constant

Trinomial : three terms

$4x + 7 + x^2$

↑ Variable Terms ↑

Greatest Exponent in the polynomial

Exponent x^n	Type of Polynomial
x^0	Constant
x^1	Linear
x^2	Quadratic
x^3	Cubic
x^4	Quartic

Standard Form:

When a polynomial is written so that the exponents go in descending order

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Ex1: $16x - 30x^3 - 2 + 2x^6$

Rewrite in standard form: $2x^6 - 30x^3 + 16x - 2$

Variable terms (coefficients): $2x^6, -30x^3, 16x$

Constant terms: -2

Degree of the polynomial: $6 \leftarrow (x^6)$

Leading coefficient of the polynomial: 2

GCF of the coefficients: 2

Ex2: $6x - 12x^3 + 15$

Rewrite in standard form: $-12x^3 + 6x + 15$

Variable terms (coefficients): $-12x^3, 6x$

Constant terms: 15

Degree of the polynomial: 3

Leading coefficient of the polynomial: -12

GCF of the coefficients: 3

↑ 3 goes into 6, -12, 15

Part 2: Adding Polynomials

Ex3: $(4x^3 + 12x^2 + 6 + 8x) + (5x^2 + 9 - 6x)$

- Rewrite in Standard Form
- Line Up By Like-Terms

Line up by like-terms!

Add coefficients only

$$\begin{array}{r} 4x^3 + 12x^2 + 8x + 6 \\ + \quad 5x^2 - 6x + 9 \\ \hline 4x^3 + 17x^2 + 2x + 15 \end{array}$$

Not exponent

- When adding/subtracting polynomials, only the Coefficients change; the Exponents do not.

a. $(3x^2 + 5x - 6) + (-3x - x^2 + 3)$

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

b. $(2x^2y - 3xy^2 - y^3) + (-xy^2 + 2x^2y)$

$$\begin{array}{r} 2x^2y - 3xy^2 - y^3 \\ + \quad 2x^2y - xy^2 \\ \hline 4x^2y - 4xy^2 - y^3 \end{array}$$

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Algebra 1: Unit 3 Notes

Subtracting Polynomials

Ex4: $(2 + 9x^2) - (-6x^2 - 3x + 1)$ *To subtract polynomials,* ADD *the* OPPOSITE.

$2+9x^2+(6x^2+3x-1)$

- CHANGE TO ADDITION
- EACH TERM'S SIGN GETS SWITCHED

$9x^2 + 2$

$+ \quad 6x^2 + 3x - 1$

$15x^2 + 3x + 1$

c. $(3a^3 - 2a) - (a^3 - 8 + 4a^2)$

$3a^3 - 2a + (-a^3 + 8 - 4a^2)$

$3a^3 - 2a$

$+ \quad -a^3 - 4a^2 + 8$

$2a^3 - 4a^2 - 2a + 8$

d. $(-3y - 5 + y^2) - (y^2 - 7y + 4)$

$+(-y^2 + 7y - 4)$

$y^2 - 3y - 5$

$+ \quad -y^2 + 7y - 4$

$4y - 9$

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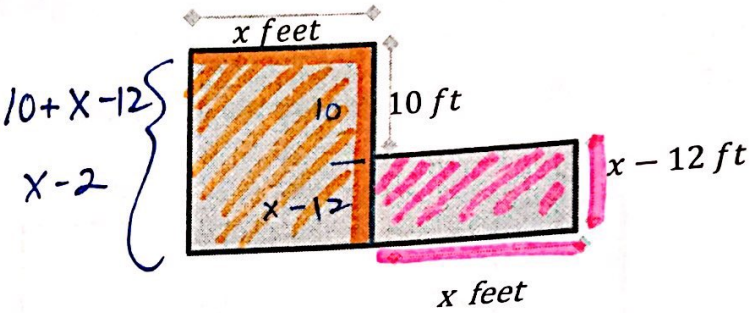
Ex5: This is a layout for your new deck.

a. How do you find area of such a figure?

- FIND AREA OF EACH RECTANGLE
- ADD RECTANGLE AREAS



10+X-12
X-2

b. Find the area of the whole figure in terms of x.

$x(x-2) + x(x-12)$

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

$2x^2-10x$

c. If $x = 20$, find the area of the deck.

$2(20^2)-10(20)$

$2(400)-200$

$800-200$

$600\ ft^2$

d. You are going to put sealant on the deck. A gallon covers 400 ft^2. How many gallons will you need to buy?

2 gallons!

Exit ticket: How are adding and subtracting polynomials alike?