MTH1W Grade 9 Mathematics

2.4 Adding and Subtracting Polynomials

Goal(s)   *- Classify polynomials*

- Develop strategies to add/subtract polynomial expressions

Page 74 #s 3ac, 4ac, 5ace, 7, 9aceg, 11, 12

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Polynomials

The word polynomial comes from the Greek work "poly" which means many, and "nomial" which is related to numbers and terms.

So... **POLYNOMIAL**s are **made up** of *numbers* and/or *terms* separated by addition or subtraction operators!

$3x^2 - 7x + 4$ is an example of a polynomial, made up of *3 terms*.

1ST   2ND   3RD

It can also be represented using algebra tiles:

$3x^2$ $-7x$ 4
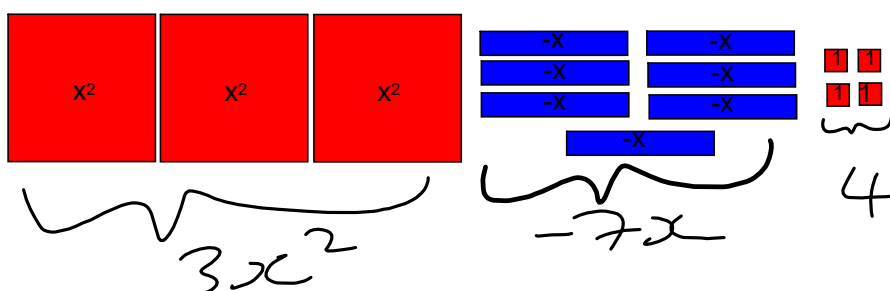
Classifying Polynomials

We can classify polynomials by the number of terms in the polynomial:

monomial - **one** term _____ $5y$

binomial - **two** terms _____ $3x - 4y$

trinomial - **three** terms _____ $2x^2 - 5x + 1$

Adding Polynomials

1. Remove the brackets.

2. Collect / group like terms (remember that the sign to the left of the term stays with it!)

3. Add coefficients of like terms.

$(2w + 7) + (-3w + 12)$

$$= 2w + 7 - 3w + 12$$

$$2w - 3w = -w$$

$$7 + 12 = 19 \implies -w + 19$$

Adding Polynomials

(-3x + 2y - 6) + (5x + 7y - 8)

$$= -3x + 2y - 6 + 5x + 7y - 8$$

$$-3x + 5x = 2x$$

$$2y + 7y = 9y$$

$$-6 - 8 = -14$$

$$\implies 2x + 9y - 14$$

Adding Polynomials

(3x³ - 2x² + x - 8) + (-4x² + 7x +21)

$$= 3x^3 - 2x^2 + x - 8 - 4x^2 + 7x + 21$$

$$-2x^2 - 4x^2 = -6x^2$$

$$x + 7x = 8x$$

$$-8 + 21 = 13$$

$$\implies 3x^3 - 6x^2 + 8x + 13$$

What About Subtracting Polynomials??

(3x + 2) - (x + 1)

When subtracting a bracket, you are subtracting EVERY term in that bracket.

$$\Rightarrow \underline{3x} \underline{+2} \underline{-x} \underline{-1}$$

$$3x - x = 2x$$

$$2 - 1 = 1 \qquad \Rightarrow 2x + 1$$

Subtracting Polynomials

1. Remove the brackets.

2. Collect / group like terms (remember that the sign to the left of the terms stays with it!)

3. Subtract the coefficients of like terms.

$$\overbrace{-2w}\quad -(-12)$$

(3w + 7) - (2w - 12)

$$= \underline{3w} \underline{+7} \underline{-2w} \underline{+12}$$

$$3w - 2w = w$$

$$7 + 12 = 19 \qquad \Rightarrow w + 19$$

Subtracting Polynomials

$$-(-4x) \; -(-3)$$

$$(5x + 6) - (-4x - 3)$$

$$= \; 5x + 6 + 4x + 3$$

$$5x + 4x = 9x$$

$$6 + 3 = 9$$

$$\implies 9x + 9$$

Subtracting Polynomials

$$-6x^2 \; -(-2)$$

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

$$= \; -2x^2 + 3 - 6x^2 + 2$$

$$-2x^2 - 6x^2 = -8x^2$$

$$3 + 2 = 5$$

$$\implies -8x^2 + 5$$