Sec. 5.3: Adding and Subtracting Polynomials

Learning Targets – day 3

1. **Adding and subtracting polynomials vertically by:**
   - Lining up like terms
   - Adding in zero terms for missing terms
   - Combining like terms vertically
   - Write our answers in descending degree

Adding Polynomials:
In the second approach, the polynomials can be added together in a vertical fashion, where polynomials are written in such a way that their like terms like up vertically:

$$+ \quad \begin{array}{l} 6x^2 + 3x - 7 \\ \underline{8x^2 - 4x + 2} \end{array}$$

If a question presents the polynomials in a **_horizontal_** fashion, we can change the problem to the **_vertical_** fashion. We must be careful to make sure the like terms line up.

If both polynomials have the same kinds of terms, lining up the terms is pretty easy and straightforward. But if one polynomial doesn't have the same kinds of terms the other one has, we need to make sure we add in "**zero terms**" to one or both so that we can line up like terms everywhere.

Ex: $(2x^2 - 7) + (-6x + 2)$

Practice: re-write vertically, line up like terms, write the answer in descending degree

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

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

3. $(a - 2a^2 - 3) + (a^2 + 7 - 2a)$

4. $(-p + 10p^2 - 3) + (-2p^2 + 3p + 3)$

You Try:
Add the following polynomials vertically. Write your answers in descending degree:

1) $(5 - 11a) + (6a - 4a^2)$

2) $(4x^2 - x + 13) + (-2x^2 + 6x - 1)$

Subtracting Polynomials:
Polynomials can be subtracted in this vertical fashion also. We will still employ the "adding the opposite" strategy in order to subtract in this fashion.

$$- \quad \frac{6x^2 + 2x - 4}{3x^2 - 4x - 6}$$

Practice: add the opposite, re-write vertically, line up like terms, write the answer in descending degree

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

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

3. $(5a^2 + 5a - 8) - (2a + 5a^2 - 8)$

4. $(m^2 + 2m) - (3 - 21m)$

You Try:
Subtract the following polynomials vertically. Write your answers in descending degree:

1) $(7 + 18n) - (6n - 3n^2)$

2) $(3x^2 - 3x + 10) - (-x^2 + 2x - 8)$