

# Class 7: Polynomials Continued

## (50 points)

Objective: The objective of this class is to understand the basic concepts of adding, subtracting and multiplying polynomials.

Outcome: The outcome of this class is to be able to understand and explain what the process is to add, subtract and multiply polynomials. In addition, the outcome of the class is work on practice problems that will help become familiar with solving these problems.

Directions: All of the following information should be answered in a google document. There are more directions in each part for further explanation.

### Part I: Adding and Subtracting Polynomials (25 points)

**Read the notes, visit the website on how to add and subtract polynomials, answer the essay questions and complete the quiz. Lastly, complete the extra practice at the end of part one.**

#### Notes:

To add polynomials we simply add any **like terms** together .. so what is a like term?

**Like terms** are terms whose variables (and their exponents such as the 2 in  $x^2$ ) are the same. In other words, terms that are “**like**” each other.

Note: The coefficients (the numbers you multiply, such as the “5” in  $5x$ ) can be different.

Example:  $7x$   $x$   $-2x$   $3x$  ... are all like terms because the variables are all  $x$ .

Example:  $(\frac{1}{3})xy^2$   $-2xy^2$   $6xy^2$   $xy^2/2$  ... are all like terms because the variables all have  $xy^2$

**Website:** Review this [website](#) on how to add and subtract polynomials. This website is very informative on how to do this. Also, take the time to watch the videos on the page as it is a great way for you to visually see the adding and subtracting being done. NOTE: if you skip this part you will not be able to continue because you will be confused.

**Essay Questions:** In google docs answer each of following questions in five to seven sentences.

1. What are like terms, what are three examples and three non examples.
2. How do you add polynomials (steps, columns, multiple)? Give two examples
3. How do you subtract polynomials? Give two examples.

**Quiz:** Visit the following [website](#) and complete the quiz. once you have earned a 100%, screen shot your results and post them into google docs.

**Extra Practice:** Complete the following addition and subtraction problems, you will have to do your work on a blank piece of paper, put your final answer in google docs, and a 2 to 4 sentence explanation of your answer.

1.  $(2x + 5y) + (3x - 2y)$
2.  $(6x^3 - 2x^2 + 8x) - (4x^3 - 11x + 10)$
3.  $(x^3 + 3x^2 + 5x - 4) - (3x^3 - 8x^2 - 5x + 6)$
4.  $(x^3 + 5x^2 - 2x) + (x^3 + 3x - 6) + (-2x^2 + x - 2)$
5.  $(7x^2 - x - 4) + (x^2 - 2x - 3) + (-2x^2 + 3x + 5)$

## Part II: Multiplying Polynomials (15 points)

Read the notes and solve the practice problems in google docs.

### Notes:

To multiply two polynomials:

1. Multiply each term in one polynomial by each term in the other polynomial
2. Add those answers together , and simplify if needed.

Example 1:

$$(3x^5)(2x^2) = 6x^7$$

1. Multiply the coefficients ( $3 \cdot 2 = 6$ ).
2. Add the exponents for the base x: ( $5 + 2 = 7$ )

Example 2:

$$(3x^2y^4)(5xy^8) = 15x^3y^{12}$$

1. Multiply the coefficients ( $3 \cdot 5 = 15$ )
2. Add the exponents for the base x ( $2 + 1 = 3$ ) \*When there is no exponent (x), the exponent is assumed to be 1)
3. Add the exponents for the base y: ( $4 + 8 = 12$ )

In our first example, pay close attention to how the distributive property is used.

## Example 1

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

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

$$\begin{array}{ccc} \downarrow & \downarrow & \downarrow \\ 6x^4 & - 12x^3 & + 3x^2 \end{array}$$

### Original Problem

Distribute  $3x^2$  throughout the parenthesis.

Multiply the coefficient and add the exponents.

**Solution:**

$$6x^4 - 12x^3 + 3x^2$$

## Example 2

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$$2a^2b^2(a^3 + 3ab - b^3)$$

$$2a^2b^2(a^3) + 2a^2b^2(3ab) + 2a^2b^2(-b^3)$$

$$\begin{array}{ccc} \downarrow & \downarrow & \downarrow \\ 2a^5b^2 & + 6a^3b^3 & - 2a^2b^5 \end{array}$$

### Original Problem

Distribute  $2a^2b^2$  throughout the parenthesis.

Multiply the coefficients and add the exponents of like bases for each term.

**Solution:**

$$2a^5b^2 + 6a^3b^3 - 2a^2b^5$$

**Practice:** Solve the following monomial multiplication problems. Post your answer and explain in two to three sentences in google docs.

- 1)  $3y^2(5y + 2)$
- 2)  $-2x^5(-9x - 5)$
- 3)  $7x^2y(x + 2)$
- 4)  $3x(4x + 3a)$
- 5)  $5x^2(-8y + x)$
- 6)  $2x^2y(-3x^2 - 4xy + 5y^2)$

### Part III: Foiling (10 points)

Read the notes, complete the practice problems and jeopardy game in google docs.

#### Notes:

In part two you learned about multiplying one term by a few terms in brackets. Now, we are going to briefly review how to multiply two terms by two terms. Ex:  $(a+b)(c+d)$  ... or two terms by three terms, and so forth.

### Multiplying Different Types of Polynomials

$$(x+2)(x+1) \quad 2 \text{ terms} \times 2 \text{ terms}$$

$$3x(4x+2y) \quad 1 \text{ term} \times 2 \text{ terms}$$

$$(x^2+5)(x^2-11x+6) \quad 2 \text{ terms} \times 3 \text{ terms}$$

$$(x^2+4x+3)(2x^2-9x+7) \quad 3 \text{ terms} \times 3 \text{ terms}$$

Part II

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Website: Visit the following website and scroll till it says 2 terms x 2 terms. Review the website and answer the following questions in your google docs.

1. What does FOIL stand for, why do we use it, and what does it mean? Give an example of it in use. (5-7 sentences)

2. How do you multiply two terms by three terms? Give an example of this. (5- 7 sentences)

**Practice:** Complete the following multiplication problems, you will have to do your work on a blank piece of paper, put your final answer in google docs, and a 2 to 4 sentence explanation of your answer.

1. Multiply out  $(3x + 2)(4x - 5)$
2. What is the product of  $(5x - 2)$  and  $(2x + 7)$
3. Multiply out  $(x - 4)(3x - y + 3)$

**Game:** Are you ready to play Polynomial Jeopardy?

1. Visit the following [website](#), click “**Play this Game!**” (you may have to download the latest version of java, that is okay, just download it to play)
2. When it asks to put **name 1** and name 2 (optional), only put your name in the name 1 spot and press **Begin 1-Player Game**.
3. There are twenty-five questions to choose from, I would like for you to choose a combination of problems to get to a total of 2,000 points.
4. In your google docs, write the question you selected, the category it is from (adding, subtracting, mixed bag, cat in the hat, or catch the bat) and the correct answer with a two sentence explanation.

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Congratulations you have finished class 7!