Math 9 Dawe

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 **Chapter 4 – Polynomials**

Test Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

To do:

4.1 – Polynomials

* Complete Notes ⃝
* Quiz 1 ⃝

4.2 – Simplify Polynomials

* Complete Notes ⃝

4.3 – Adding and Subtracting Polynomials

* Complete Notes ⃝
* Quiz 2 ⃝

4.4 – Multiplying and Dividing Monomials

* Complete Notes ⃝

4.5 – Multiplying Polynomials by Monomials

* Complete Notes ⃝

4.6 –Dividing Polynomials by Monomials

* Complete Notes ⃝

Chapter Assignment Handout ⃝

**Write Unit Test ⃝**

Math 9 **Lesson 4.1 – Polynomials** Dawe

An \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is the result of applying arithmetic operations to numbers and variables. For example:

The variable \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ has a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of \_\_\_\_\_\_\_. The \_\_\_\_\_\_\_\_\_\_\_\_ is a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

A \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is an algebraic expression that is the sum of numbers and terms involving variables with exponents that are whole numbers; the variables can be multiplied by or divided by any numbers. For example:

A \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is a part of a polynomial, separated from the other terms by addition signs. For example:

A \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is the power to which the variable in a term is raised; if a term contains two variables, its degree is the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of the exponents of those variables. For example:

The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is the greatest of the degrees of the polynomial’s terms. For example:

**Example 1:** Identify each expression as a monomial, binomial, or trinomial. Identify the degree of each polynomial, all coefficients, variables, and constants.

$-6a^{3}b^{2}$ $2x+7$ $x^{2}-6x+9$

**Example 2:** Write the following polynomial in descending order.

$$7x^{3}y-5x^{4}+9x^{2}y^{4}+8x^{5}-2x-13$$

**Example 3:** Evaluate the following polynomial for $x=2$

$$7x^{2}-3x+5$$

Math 9 **Lesson 4.2 – Simplify Polynomials** Dawe

In order to model polynomials you may need to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, which is the act of combining or gathering “like terms” creating an equivalent polynomial with fewer terms.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ are terms of a polynomial that are identical (same variable and same exponent) except for their coefficients. For examples:

**Example 1:** Simplify $2x-3x^{2}+5-4x+6x^{2}$:

**Example 2:** Which two of the following polynomials below are equivalent? Explain:

1. $2x^{2}+xy-y^{2}-2y+1$
2. $2x^{2}-xy-y^{2}-2y+1+x^{2}-2x^{2}+xy$
3. $xy+2x^{2}+xy-y^{2}-2y+1+x^{2}-x^{2}+xy-2xy$

Math 9 **Lesson 4.3 – Adding and Subtracting Polynomials** Dawe

To add polynomials, we group \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and simplify.

To subtract a polynomial, we add its \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**Example 1:** Add $(4x^{2}+2xy-8)$ to $(-6x^{2}-4xy)$:

**Example 2:** Joan and Chris both have jobs. They work the same number of hours per week. Their pay rates and expenses are shown:

|  |  |  |
| --- | --- | --- |
|  | **Pay per Hour** | **Weekly Expenses** |
| Joan | $15 | $40 Transportation |
| Chris | $14 | $35 Cafeteria Charge |

1. Use a polynomial to describe their combined income:
2. Determine their combined weekly income if they both work 40 h in a week:

**Example 3:** Determine the difference of $3x^{2}-2x+2$ by $2x^{2}-2x+1$:

**Example 4:** Determine the difference of the following polynomials:

1. $3x^{2}-2x+1$ and $2x^{2}-2x-2$
2. $-4x^{2}+xy+1$ and $-2x^{2}+3xy+1$

Math 9 **Lesson 4.4 – Multiplying and Dividing Monomials** Dawe

A monomial is a polynomial with only \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ term. For example:

To multiply two monomials, multiply their \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ together, and their variables (which is the sum of their \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_).

To divide two monomials, divide or \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ their coefficients and variables (which is the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of their exponents).

**Example 1:** Simplify:

1. $(4x)(2x)$ b) $10xy÷5y$

**Example 2:** Find the product or quotient of the pair of monomials.

$(-x)(4x)$ $2x÷2$

Math 9 **Lesson 4.5 – Multiplying Polynomials by Monomials** Dawe

When we multiply a monomial times a polynomial with more than one term, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the monomial onto every term in the polynomial using multiplication. For example:

**Example 2:** Determine the product of

 $-4\left(5-2x\right)$

$$2x^{2}(-3x^{2}+8)$$

$$2x-4y-4(3x-2y)$$

Math 9 **Lesson 4.6 – Dividing Polynomials by Monomials** Dawe

When dividing a polynomial by a monomial, we must divide each of the terms on the \_\_\_\_\_\_\_\_ by the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. For example:

**Example 1:** Divide

 $(4x^{2}+8x)$ by $2x$

$4x^{2}y-6x^{3}y^{2}$ by $8xy$