Name: _____ Date: _____

MFM2P: Foundations of Mathematics 10 Numeracy and Algebra

Polynomials and Like Terms

1. Polynomials and Terms

A polynomial is an expression or relation containing one or more **terms**.

Each term may have a **coefficient**, a **variable**, and an **exponent**.

Polynomials can be classified in different ways.

$\underbrace{7x^2}_{\text{term 1}} + \underbrace{3x}_{\text{term 2}} - \underbrace{13}_{\text{term 3}}$

$\underbrace{15}_{\text{coeff}} \cdot \underbrace{x}_{\text{var}}^{\overset{\text{exp}}{\leftarrow 2}}$

2. Like Terms

If two terms have the same variables with the same exponents, they are **like terms**. $3x^2$ and $-7x^2$

Constants are always like terms (exponent is zero). 5 and 92

3. Simplifying Expressions By Collecting Like Terms

Like terms can be combined using addition or subtraction.

It may be possible to simplify multiple groups of like terms.

$$5x+8x=(5+8)x=13x$$
$$\begin{aligned} 10x+3+x+4 &= 10x+x+3+4 \\ &= 11x+7 \end{aligned}$$

4. Examples

A. Identify the like terms in the list below:

$5x^2$ $5x$ $-6x^2$ $-2x$ 5 $6y^2$ -2 x

$5x^2$ and $-6x^2$ both have the variable x and an exponent of 2, so they are like terms.
$5x$, $-2x$ and x have an implied exponent of 1, so they are like terms.
5 and -2 are constants, and are like terms.
Since there are no other terms with the variable y, $6y^2$ has no like terms.

B. Simplify the expression $7x+4-5x+9$.

$7x$ and $-5x$ are like terms, as are 4 and 9, so they can be collected.

$$\begin{aligned} 7x+4-5x+9 &= 7x-5x+4+9 \\ &= 2x+13 \end{aligned}$$

C. Simplify $6x^2+x-2x^2+3x-5+7x$.

$6x^2$ and $-2x^2$ are like terms, as are x, $3x$ and $7x$. The only constant is -5.

$$\begin{aligned} 6x^2+x-2x^2+3x-5+7x &= 6x^2-2x^2+x+3x+7x-5 \\ &= 4x^2+11x-5 \end{aligned}$$