5.3 Adding and Subtracting Polynomials

Explore Adding or Subtracting Polynomial Expressions

The following notes provide guidelines to help you adapt the Explore Adding or Subtracting Polynomial Expressions section from *MathLinks 9*.

- Read the introduction aloud and solicit other real-life examples from students of things that may be expressed using a polynomial expression (e.g., cell phone packages, Internet packages).
- For #1, ask students to calculate the cost of one month and two months to help identify the expression.
- Allow students to work in pairs and share their responses with the class.

Examples

- In the Warm Up, discuss #6 to ensure that students recognize the relationship between the two expressions.

Working Example 1:

- Encourage students to use strategies to identify like terms and represent polynomials.
- Provide students with algebra tiles. If algebra tiles are not available, use **Master 11 Algebra Tiles (Positive Tiles)** and **Master 12 Algebra Tiles (Negative Tiles)**.
- For Method 1, students can work individually or in pairs. Clear the desks so that students can readily observe the tiles. Ask students to build a given polynomial and then add another polynomial. Begin with sums of constants, then monomials, binomials, and combinations. Include zero pairs. While students model the sums, write the original polynomials and the polynomial that represents the final simplified answer on the board. Discuss patterns.

Working Example 2:

- Review opposites. Have students use algebra tiles to build examples of polynomials and display the opposite polynomial. Reinforce the concept that a polynomial and its opposite have a sum of zero.

Working Example 3:

- Write the symbolic representation of each polynomial on the board. Have students discuss patterns they see in a polynomial and its inverse/opposite.
- Review how to subtract integers. Use algebra tiles to build several pairs of questions, such as $5 - 3$ and $5 + (-3)$, $3 - 5$ and $3 + (-5)$, and so on. Generate patterns for students to observe.
- Expand the pattern to include the difference of polynomials.
- For Method 2, you may wish to show an extra step: $3x - 2x + 3 - 4$
$= (3 - 2)x + 3 - 4$
- Encourage students to write questions vertically so they can align like terms. This will help them visualize the operations more clearly.

Communicate the Ideas, Practise, and Apply

- Encourage students to try multiple approaches to each question to give them time to develop the confidence to perform the operations symbolically.
- Provide students who need additional practice with **BLM 5–5 Section 5.3 Extra Practice**.

Math Link

- For part b), encourage students to look at the explanations in the arithmetic column of part a) for help.

Common Errors

- When subtracting polynomials, some students may use the wrong sign for the second term.

R$_x$ Remind students to enclose the second term in parenthesis, thereby providing a visual clue that all terms change signs. Encourage students to use tiles or diagrams so they can see the additive inverse or the opposite. Alternatively, encourage students to write the question vertically to help them recognize the sign changes.