

M9

Adding and Subtracting Polynomials

4.3

Adding Polynomials

- There are two methods for adding polynomials: A horizontal method and a vertical method.
- Final answer is always put in **standard form**.

Horizontal method

Example: Simplify the given polynomials by adding them. Use the horizontal method.

- Remove the brackets.
- Identify and collect like terms.
- Express in standard form.

a)

$$(8x - 2x^2) + (x^2 - 9x + 10)$$

b)

$$(2x^4 + 5x - 7) + (3x - 5x^4 + 2) + (-x + 10)$$

Vertical method

Example: Simplify the given polynomials by adding them. Use the vertical method.

- Remove the brackets.
- Write the given polynomials underneath each in such a way that like terms are below each other.
- Express in standard form.

$$(6x^3 - x^2 + 4x - 7) + (3x^2 - 5x^3 + 2x) + (-4x + 5)$$

Distributing the negative sign

Recall: a negative sign in front of a variable can be written as a negative one. Similarly, we can rewrite an entire polynomial that has a negative sign in front of it as a polynomial that was multiplied by negative one.

Example: Rewrite the given polynomial by distributing the negative sign.

a)

$$-(3x^2 - 5x^3 + 2x + 5) =$$

b)

$$-(-x^2 + 4x^7 - 12x - 3) =$$

Subtracting Polynomials

- Remove brackets from polynomials that do not have a negative sign in front of them.
- Distribute the negative sign to every term of a polynomial that has a negative sign in front of it. Once you distributed the negative sign you do not need to write the brackets.
- Collect like terms and simplify.
- Express in standard form.

Example: Simplify the given polynomials by subtracting them. Express final answer in standard form.

a)

$$(x^2 - 4x^3 + x + 1) - (3x^2 + x^3 + 2x + 5) =$$

b)

$$-(5x^2 + x - 9) - (x^2 - 2x + 5) =$$