**Adding and Subtracting Polynomials**

**What is a Polynomial?**

A polynomial is an algebraic expression consisting of one term or a sum of terms:

- ex: $3x^4 + 3x^2$ is a polynomial with two terms (Binomial)
- ex: $7x^3 + 4x + 9$ is a polynomial with three terms (Trinomial)

**Example 1:**

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

Since we are adding these polynomials, we do not need the parenthesis.

$4x^2 + x + 7 + 2x^2 + 3x - 2$

$= 6x^2 + 4x + 5$ (combine like terms)

**Example 2:**

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

Since we are subtracting these polynomials, we need to distribute the negative.

$4x^2 + x + 7 - 2x^2 - 3x + 2$

$= 2x^2 - 2x + 9$
Example 3:

\[ \text{a) } (7x^2 - 2x + 7) + (8x^3 + 9x) \]

\[ \text{b) } (4x^2 + 3x - 1) + (3x^2 + 4x + 9) - (x^2 - x + 4) \]
### Adding and Subtracting Polynomials - Practice Problems

**Simplify each expression:**

1. \(2x^5 - 4x^4 + 5x^5 + 2x\)

2. \((4w^3 - 4w^2 - 4) + (6w^3 + 5w^2 - 8)\)

3. \((4w^3 - 4w^2 - 4) - (6w^3 + 5w^2 - 8)\)

4. \(12x^2 + 4x - 2 - 3x^2 + 4x + 9\)