Adding and Subtracting Polynomials

**Vocabulary:**

**Polynomial:** Finite sum of terms, where each term is a number, or the product of a number and one or more variables, raised to a whole number power.

Which of the following are polynomials?

\[ 3x^2 + 2x + 1 \quad 9x^{-2} + x^{-1} \quad 3a - 2b + 4c - 5d \]
\[ \sqrt{2x^2 + 3y^2} \quad 15x^2y + 21xy^3 - 4 \quad 3x^{1/2} - 5x \]

- **Monomial:** 1 term polynomial
- **Binomial:** 2 term polynomial
- **Trinomial:** 3 term polynomial

**Degree of a Monomial:** is the sum of the exponents of the variables.

**Degree of a Polynomial:** is the same as that of its term of highest degree.

**Standard Form of a Polynomial:** Written with the terms in descending order of degree.

Identify each of the following as a trinomial, binomial, or monomial. State the degree of the polynomial.

1. \( 3x^4 + 1 \)
2. \( 3x^2 + 2x + 1 \)
3. \( 7 \)

Combine like terms. Write in standard form, if possible.

4. \( 9x^2 + 8x - 1 + 2x^2 - 8x - 6 \)
5. \( 5x - 12 + 6x + x^3 + 3x^2 - 8x^3 - 6 \)
Perform the following additions and subtractions. Write answers in standard form, if possible.

6. \((2x^2 - 3xy + 4y^2) + (-6x^2 + 9xy - 9y^2)\)

7. \((3x^2 - 5x + 3) - (7x^3 + x - 1)\)

8. \(5(4x - 9) - 6(3x + 5)\)