

## 5.2 - Adding and Subtracting Polynomials

①

A polynomial is an expression of the form

$$a_n x^n + a_{n-1} x^{n-1} + a_{n-2} x^{n-2} + \dots + a_1 x + a_0$$

→ The  $a$ 's are called coefficients and are real numbers

→  $a_n$  - leading coefficient

→  $a_0$  - constant term

→ The degree is  $n$  (highest power)

→ powers must be nonnegative integers

power on  $x$  is not an integer

$\sqrt{x} + 1$  is not a polynomial

$x^{-1} + x + 2$  is not a polynomial

negative power

→ The linear functions we've spent a lot of time working with are polynomials of degree 1.

→ We want to be able to do operations with polynomials.

↳ we'll talk about adding, subtracting, and multiplying polynomials

↳ division is in chapter 6.

→ Adding/subtracting polynomials is easy. Just combine like terms

EX  $(3x^2 - 2x + 5) + (4x^2 + 7)$  or vertically

$$= 3x^2 - 2x + 5 + 4x^2 + 7$$

$$= 7x^2 - 2x + 12$$

$$\begin{array}{r} 3x^2 - 2x + 5 \\ 4x^2 \quad + 7 \\ \hline 7x^2 - 2x + 12 \end{array}$$

Ex  $(4x^3 - 3x + 1) - (2x^2 + 4x - 3)$

$$= 4x^3 - 3x + 1 - 2x^2 - 4x + 3$$

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

vertically

②

$$4x^3 \quad -3x + 1$$

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

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

Ex  $(8x^2 - 5x) + (3x^2 + 2) - (4x^2 - 5x + 7)$

$$= 8x^2 - 5x + 3x^2 + 2 - 4x^2 + 5x - 7$$

$$= 7x^2 - 5$$