

# Add and Subtract Polynomials

Adding and subtracting polynomials is as simple as combining like terms.

$$\text{Add: } (4x^3 - 5x^5 + 3x) + (4 - 4x^3 + x^4 + x)$$

$$(4x^3 - 5x^5 + 3x) + (4 - 4x^3 + x^4 + x)$$

Identify like terms

$$-5x^5 + x^4 + 4x + 4$$

Combine like terms  
and put in standard  
form

Subtract:  $(x^3 + 5x^2 + 9x) - (x^4 - x^3 + 2x + 3)$

$$x^3 + 5x^2 + 9x - x^4 + x^3 - 2x - 3$$

Distribute the negative

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

Combine like terms  
and put in standard  
form

Given:  $A(t) = t^2 - t - 5$ ,  $B(t) = t^3 + 3t + 4$ ,

$D(t) = B(t) + A(t)$ , and  $E(t) = A(t) - B(t)$ .

Evaluate  $D(t)$  and  $D(3)$ .

$$D(t) = B(t) + A(t)$$

$$D(t) = t^3 + 3t + 4 + t^2 - t - 5$$

$$D(t) = t^3 + t^2 + 2t - 1$$

$$D(3) = (3)^3 + (3)^2 + 2(3) - 1 \quad D(3) = 41$$

Evaluate  $E(t)$  and  $E(-1)$ .

$$E(t) = A(t) - B(t)$$

$$E(t) = t^2 - t - 5 - (t^3 + 3t + 4)$$

$$E(t) = t^2 - t - 5 - t^3 - 3t - 4$$

$$E(t) = -t^3 + t^2 - 4t - 9$$

$$E(-1) = -(-1)^3 + (-1)^2 - 4(-1) - 9$$

$$E(-1) = -3$$

$$(x^2y^3 - 2x^2y + 3x) + (2xy^2 + 5x + 3x^2y^3)$$

$$(x^2y^3 - 2x^2y + 3x) + (2xy^2 + 5x + 3x^2y^3) \quad \text{Identify like terms}$$

$$4x^2y^3 - 2x^2y + 2xy^2 + 8x \quad \text{Combine like terms and write in standard form}$$

$-2x^2y$  and  $2xy^2$  are not like terms, but they do have the same degree.

Which one goes first?

The one with the  $x^2$  goes first since  $x^2$  is a greater power than  $x$ .