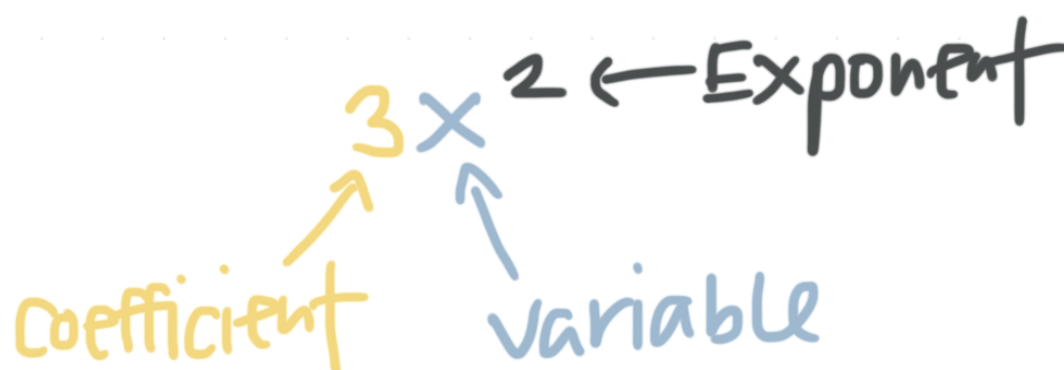


Adding and subtracting polynomials

When adding and subtracting polynomials, you're really just looking for like terms to combine. Remember that a polynomial can have multiple terms, and that x (or any variable that's used) can be raised to any positive integer power or 0.

The largest exponent in a polynomial is called the **degree** of the polynomial. The term with the largest exponent is called the **leading term**, because the terms of a polynomial are usually written in descending order of their exponents.

Remember that for purposes of addition and subtraction, like terms are terms that have the same base (the same variable) and the same exponent. We combine them by adding or subtracting the coefficients (the numbers in front of the variable) and keeping the exponent. Remember that x can also be written as $1x^1$.



Example

Simplify the expression.

$$(3x^2 + 6x - 8) + (-12x^2 + 1)$$



First, remove the parentheses.

$$3x^2 + 6x - 8 - 12x^2 + 1$$

Next, group like terms together in descending order of their exponents.

$$3x^2 - 12x^2 + 6x - 8 + 1$$

Finally, combine like terms by adding their coefficients.

$$(3 - 12)x^2 + 6x + (-8 + 1)$$

$$-9x^2 + 6x - 7$$

Let's try another example of adding and subtracting polynomials.

Example

Simplify the expression.

$$(2x^3 + 5x^2 - 7x + 1) - (x^3 + 3x - 6x^2 - 4)$$

First, remove the parentheses. Since this is a subtraction of polynomials, remember to multiply every term in the second polynomial by -1 when you do that.

$$2x^3 + 5x^2 - 7x + 1 - x^3 - 3x + 6x^2 + 4$$



Group like terms together in descending order of their exponents and combine them.

$$2x^3 - x^3 + 5x^2 + 6x^2 - 7x - 3x + 1 + 4$$

$$(2 - 1)x^3 + (5 + 6)x^2 + (-7 - 3)x + (1 + 4)$$

$$x^3 + 11x^2 - 10x + 5$$

