

# LEARNING MODULE 4

Add and Subtract Simple Monomials



**GRADE 8**



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# 1

## ADD AND SUBTRACT SIMPLE MONOMIALS

### WELCOME, GRADE 8 LEARNERS!

Welcome to the world of monomials, where we embark on a journey to understand the fundamental operations of addition and subtraction. Monomials, simple algebraic expressions consisting of a single term, are powerful mathematical entities. As we delve into the art of combining and rearranging these monomials, our focus will be on remembering key rules and understanding the principles governing these operations.



### LEARNING OBJECTIVES

1

Identify the basic components of monomials

2

Explain the steps of adding and subtracting monomials

3

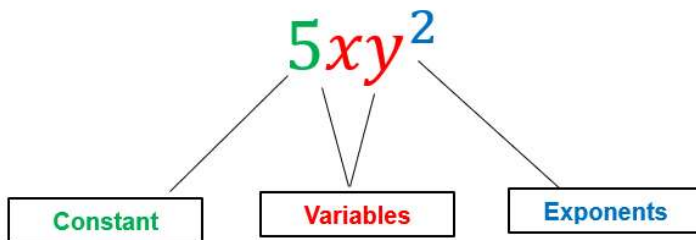
Recognize the significance of mastering the concepts of adding and subtracting monomials in solving mathematical problems

### What is monomial?

A monomial is an algebraic expression that consists of a single term. In other words, it is a mathematical expression with only one part. It could be a single number, a single variable, or a product of numbers and variables.



## Components of a Monomial



<b>Coefficient</b>	<p>Coefficient is the numerical factor that multiplies the variable(s) and their exponents.</p> <p>For example, in the monomial <math>5xy^2</math>, the <b>coefficient is 5</b>. It might also note that the 5 serves as the coefficient of the monomial.</p>
<b>Variables</b>	<p>These are symbols that represent unknown values.</p> <p>For example, in the monomial <math>5xy^2</math>, the <b>variables are x and y</b>.</p>
<b>Exponents</b>	<p>These are the powers to which variables are raised.</p> <p>For example, in the monomial <math>5xy^2</math>, <b>x has an exponent of 1 and y has an exponent of 2</b>.</p>

## Differentiating Monomials from Non-monomials



Monomials are algebraic expressions that consist of a single term, typically composed of constants, variables, and their exponents, such as  $5x^2$  or  $-3y$ . They are characterized by their simplicity, representing either a single number, a single variable, or a product of numbers and variables. In contrast, non-monomials contain multiple terms connected by addition or subtraction, making them more complex expressions, such as  $5x^2 + 3y$  or  $-2xy + 7$ .

**Note:** In any case there is a confusion,  $5x^2$  can be written as  $5x^{\wedge}2$ . The  $\wedge$  symbol denotes that the variable  $x$  is being raised to the power of 2.



Monomials	Not Monomials
5	$2+x$
$2x$	$x/y$
$2yxh$	$2y-4$

## Like Terms and Unlike Terms

### Like Terms:



Like terms are terms that have the same variable(s) raised to the same exponent(s) and are multiplied by the same constant.

$$3x^3, -x^3, 5x^3$$

These are like terms because they both have the variable  $x$  raised to the power of 3.

$$-x^2y^3, -10x^2y^3, 7x^2y^3$$

These are like terms because the monomials have both a variable  $x$  raised to a power of 2 and variable  $y$  raised to power of 3.

### Unlike Terms:

Unlike terms are terms that do not satisfy the conditions of like terms.

$$3x^2, -x^3, 5x^4$$



These are unlike terms. They may have the same variable  $x$ , but it is raised to different powers which are 2, 3 and 4.

$$-x^2y^4, -10x^3y^3, 7x^2y^3$$

These are unlike terms. They may have the same variables which are  $x$  and  $y$ , but they are raised to different powers.



## Steps in Adding and Subtracting Monomials



The most important thing to remember in adding or subtracting monomials, it has to be a like terms.

### Adding Monomials

1. **Add the coefficients.** Determine the coefficient of the each monomial and add. If we have the given,  $a$  and  $2a$ :

$$1+2=3$$

The coefficient of  $a$  is 1 because when a variable is written without a numerical coefficient, it's understood to be multiplied by 1. Meanwhile, the coefficient of  $2a$  is 2.

2. **Keep the variables and exponents the same.**

$$=3a$$

In the example, we just copy the variable  $a$  after adding the coefficients of each term in the monomials.

*If adding unlike terms like  $2x$  and  $2y$ , the answer will just be as is which is  $2x+2y$ .*

3. **Simplify the expression.** Simplify the expression by removing any unnecessary coefficients or parentheses.





## Subtracting Monomials

1. **Subtract the coefficients.** Determine the coefficient of each monomial and subtract it. Keep the variables and exponents the same.

If we have the given,  $7x$  and  $-3x$ :

$$7 - (-3)$$

The subtrahend,  $(-3)$  is negative. Hence, we will apply the rule of subtracting integers, “change the sign of the subtrahend then add”.

$$= 7 + 3 = 10$$



2. **Keep the variables and exponents the same.** After subtracting the coefficients, just copy the variable and the exponent.

$$10x$$

In the example, we just copy the variable  $x$  after subtracting the coefficients of each term.

*In subtracting monomials with unlike terms like  $13x$  and  $12y$ , the answer will just be as is which is  $13x - 12y$ .*

3. **Simplify the expression.** Combine like terms and simplify the expression by removing any unnecessary coefficients or parentheses.

### IMPORTANCE OF KNOWING HOW TO ADD AND SUBTRACT MONOMIALS



By understanding how to add and subtract monomials, we can simplify complex algebraic expressions, making them easier to analyze and manipulate. Moreover, the ability to add and subtract monomials is essential for isolating variables and solving equations, a fundamental skill in algebra.

