## Algebraic Expressions

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## Introduction

Algebraic Expressions are expressions which are obtained by performing a finite number of operations like addition, subtraction,
multiplication, rising to a power on symbols (terms) representing numbers.


Algebraic expressions contain variables and constants. Avariable's value is not fixed. On the other hand, aconstant has a fixed value.

For Example: $x^{2}, 2 y^{2}, 3 w+4 x y+5,2 x^{2}+5 x-7$

## Classification of Expressions

We can classify expressions as follows:

- Monomial
- Binomial
- Trinomial
- Polynomial

Let's discuss each one of them:

## Monomial

An expression with only one term is called a monomial.
For example: $2 \mathrm{x}, 3 \mathrm{xy}, 5 \mathrm{x}^{2} \mathrm{y}$

## Binomial

An expression with two unlike terms is called a binomial.
For example: $2 x+1,2 x+4 y, 7 x^{2} y+2 x^{4}$
But $2 \mathrm{x}+3 \mathrm{x}$ is not a binomial.

As, $2 \mathrm{x}+3 \mathrm{x}=5 \mathrm{x}$ which is monomial.

## Trinomial

An expression which contains three terms is called a trinomial.
For example: $2 \mathrm{x}+\mathrm{y}+\mathrm{z}, \mathrm{x}^{2}+2 \mathrm{x}+2$

## Polynomial

An expression with one or more terms is called a polynomial. A monomial, a binomial and a trinomial all are polynomials. For example: $2 \mathrm{x}, \mathrm{x}-5,12 \mathrm{x}^{2}-\mathrm{y}$

## Addition and Subtraction of Algebraic Expressions

We have two categories under addition and subtraction of algebraic expressions:

- Adding and subtracting like terms
- Adding and subtracting general algebraic expressions

We will learn the concept by taking examples:

## Adding or subtracting like terms

(i) Add: $3 y+5 y+2 y$
$=(3 x y)+(5 x y)+(2 x y)$
$=(3+5+2) y$
$=10 \mathrm{y}$
(ii) Subtract: $14 a b-12 a b$
$=(14-12) a b$
$=2 \mathrm{ab}$

So, from the above examples we conclude the following:

- The sum of two more like terms is a like term with a numerical coefficient equal to the sum of the numerical coefficient of all the like terms.
- The difference of two more like terms is a like term with a numerical coefficient equal to the difference of the numerical coefficient of all the like terms.


## Adding or subtracting general algebraic expression

(i)Add: $13 \mathrm{x}+7 \mathrm{y}+2 \mathrm{x}+6 \mathrm{a}$


In the given expression, we have 13 x and 2 x as like terms. So, we first add them.
$=15 x+7 y+6 a$
As there are no like terms left in the above expression, so we get the final answer as $15 \mathrm{x}+7 \mathrm{y}+6 \mathrm{a}$.
(ii) Subtract: $30 x y-10 x-16 y$ from $15 x y+12 y+14 x$.

First, we will write complete expression as
$15 x y+12 y+14 x-(30 x y-10 x-16 y)$
$=15 x y+12 y+14 x-30 x y+10 x+16 y \ldots$. (Open the parenthesis)
$=15 x y-30 x y+12 y+16 y+14 x+10 x \ldots$. (Writing like terms together)
$=-15 x y+28 y+24 x \ldots . .($ Combining like terms $)$
As there are no like terms left in the above expression, so we get the final answer as $-15 \mathrm{xy}+28 \mathrm{y}+24 \mathrm{x}$

Now try it yourself! Should you still need any help, click here to schedule live online session with e Tutor!

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## Reference Links:

- http://en.wikipedia.org/wiki/Expression_(mathematics)
- http://en.wikipedia.org/wiki/Term_(mathematics)
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- http://en.wikipedia.org/wiki/Constant \%28mathematics\%29
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