## Algebraic Methods of Solving a Pair of Linear Equations

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## What is a linear equation?

The pair of thelinear equation is in the following form-

$$
\begin{array}{r}
\quad a_{1} x+b_{1} y+c_{1}=0 \\
\text { and } \quad a_{2} x+b_{2} y+c_{2}=0
\end{array}
$$

The most commonly used algebraic methods of solving a pair of linear equations in two variables are -
a) Substitution method
b) Elimination method
c)Cross Multiplication method

Let's discuss these methods one by one:

## Substitution Method

Here are the steps which we follow while solving a pair linear equations:
Step I - Obtain the two equations. Let the equations be

(ii)

Step II - Choose either of the two equations, say (i), and find the value of onevariable, say y, in terms of the other, i.e. $x$.
Step III - Substitute the value of $y$, obtained in step II, in other equation i.e. (ii) to get an equation in $x$.
Step IV - Solve the equation obtained in step III to get the value of x .

Step $\mathbf{V}$ - Substitute the value of $x$ obtained in step IV in theexpression for $y$ in terms of $x$ obtained in step II to get the value of $y$.
Step VI - The values of $x$ and $y$ obtained in steps IV and V respectively constitute the solution of the given system of two linear equations.

Example: Solve the following system of equations by using the method of substitution:
$3 x-5 y=-1$
$x-y=-1$
Let, $3 x-5 y=-1$
and $x-y=-1$

From (ii), we get $y=x+1$
Substituting $\mathrm{y}=\mathrm{x}+1$ in (i), we get
$3 x-5(x+1)=-1$
$-2 x-5=-1$
$-2 x=4$
$x=-2$
Putting $x=-2$ in $y=x+1$ we get $y=-1$
Hence, the solution of the given system of equations is $x=-2$ and $y=-1$.

## Try these questions now:

1. Solve the following system of equations by using the method of substitution:
$x+2 y=-1$
$2 x-3 y=12$
(Answer: $\mathrm{x}=3$ and $\mathrm{y}=-2$ )
2. Solve the following system of equations by using the method of substitution:
$2 x+3 y=9$
$3 x+4 y=5$
(Answer: $\mathrm{x}=-21$ and $\mathrm{y}=17$ )
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/Linear_equation
- http://en.wikipedia.org/wiki/Variable
- http://en.wikipedia.org/wiki/Expression_(mathematics)

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