Algebraic Methods of Solving a Pair of Linear Equations

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What is a linear equation?

The pair of the<u>linear equation</u> is in the following form-

 $a_1x + b_1y + c_1 = 0$

and $a_2x + b_2y + c_2 = 0$

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

 $a_1x + b_1y + c_1 = 0$

and $a_2x + b_2y + c_2 = 0$ (i)

.....(ii)

Step II – Choose either of the two equations, say (i), and find the value of one<u>variable</u>, 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 V – Substitute the value of x obtained in step IV in the<u>expression</u> 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:

3x - 5y = -1

$\mathbf{x} - \mathbf{y} = -\mathbf{1}$

Let, $3x - 5y = -1$	(i)
and $x - y = -1$	(ii)

From (ii), we get y = x + 1

Substituting y = x + 1 in (i), we get

3x - 5(x+1) = -1

-2x - 5 = -1

-2x = 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:

 $\begin{array}{l} x+2y=-1\\ 2x-3y=12 \end{array}$

(Answer: x = 3 and y = -2)

2. Solve the following system of equations by using the method of substitution:

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2x + 3y = 93x + 4y = 5
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(Answer: x = -21 and 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
- <u>http://en.wikipedia.org/wiki/Expression_(mathematics)</u>

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