**Solving Linear Equations: Concepts and methods**

What are the different methods of solving the system of linear equations?

The different methods of solving the system of linear equations are:  
Elimination Method  
Substitution Method  
Graphical Method.

**SUBSTITUTION METHOD**

Q1 What is meant by the substitution method?

In mathematics, the substitution method is generally used to solve the system of equations. In this method, first, solve the equation for one variable, and substitute the value of the variable in the other equation.

Q2 Write down the steps involved in the substitution method.

The steps involved in the substitution method are:  
Solve one of the equations either for the variable x or y  
Now, substitute the solution from step 1 to the other equation  
Finally, solve the equation to find the value of the other variable

Q3 What is the benefit of using the substitution method?

The benefit of using the substitution method is that this method gives the exact values for the variables (x and y), which correspond to the point of intersection.

Q4 Can the substitution method be used to solve the system of equations in three variables?

Generally, while solving the system of equations with three variables, either we can use the substitution method or the elimination method to make the system into the system of two equations with two variables.

**ELIMINATION METHOD?**

Q1 What is meant by the elimination method?

The elimination method is the process of eliminating one of the variables in the system of linear equations using the addition or subtraction methods in conjunction with multiplication or division of coefficients of the variables.

Q2 What is the difference between the elimination method and substitution method?

The elimination method is the process of removing the variable from the system of equations, whereas the substitution method is the process of replacing a variable with a value to find the solution for the system of equations.

Q3 Mention the advantages of using the elimination method.

The advantages of using the elimination method are:  
The elimination method has fewer steps than other methods.  
It reduces the possibility of mistakes compared to other methods.

Q4 When should we use the elimination method?

The elimination method is the best choice of use when the equations are in the standard form Ax+By=C, and all the variables have coefficients other than 1.

**CROSS MULTIPLICATION METHOD**

Q1 What is a cross multiplication method?

In a cross multiplication method, we multiply the numerator of one fraction to the denominator of other and denominator of the first term to the numerator of another term.

Q2 Why we use cross multiplication method in linear algebra?

To find the solution of a pair of linear equations, we use cross multiplication method. If a1x+b1y+c1=0 and a2x+b2x+c2=0 are two linear equations, then we can find the value of x and y using this method.

Q3 How to find the solution of linear equations in two variables using cross multiplication?

To find the solution for linear equations in two variables with the help of cross-multiplication, we need to use the following equation:  
x(b1c2-b2c1) = y/(c1a2-c2a1) = 1/(b2a1-b1a2)

Q4 What is the condition to get a unique solution?

If a1/a2≠b1/b2 then we get the unique solution and the pair of linear equations in two variables are consistent.

Q5 What is the Mathematical rule of three?

The mathematical rule of three is a method where we can find the solution based on the proportions. The best example is the cross multiplication where we can find the values of unknown variables by writing in a proportion.