Some Important points

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1. Maximization problem is equivalent to the minimization of the negative of the same function, for example-

$$\text{Minimize } f = c_1x_1 + c_2x_2 + \cdots + c_nx_n \text{ is eqivalent to}$$

$$\text{Maximize } f' = -f = -c_1x_1 - c_2x_2 - \cdots - c_nx_n.$$

2. In most of the problem x_j *is* non-negative. However, a variable may be unresticted(which may me +ve, -ve or zero value) in some problems, that can be written as the difference of two non-negaive variables. Thus, if x_j is unrestricted in sign, then it can be written as-

$$x_j = x_j' - x_j'', \qquad x_j' \geq 0, \quad x_j'' \geq 0$$

3. If a constraints appear in the form of

$$a_{11}x_1 + a_{21}\,x_2 + \cdots + a_{n1}\,x_n \leq b_1,$$

It can be converted into equality form by adding a non-negative variable x_{n+1}, known as slack variable, as follows-

$$a_{11}x_1 + a_{21}\,x_2 + \cdots + a_{n1}\,x_n + x_{n+1} = b_1.$$

Similarly, if a constraints appear in the form of

$$a_{11}x_1 + a_{21}\,x_2 + \cdots + a_{n1}\,x_n \geq b_1,$$

It can be converted into equality form by sub-stracting a non-negative variable x_{n+1}, known as surplus variable, as given below-

$$a_{11}x_1 + a_{21}\,x_2 + \cdots + a_{n1}\,x_n - x_{n+1} = b_1.$$