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# Big M method or Charne's Big M method or primal penalty method or Artificial variable Technique.

If some of the constraints are of '=' or ≥ type, then they will not contain any basic variables.

Just to have a basic variable in each of them, a new variable called Artificial variable will be introduced in each of such constraints with a positive unit coefficient.

If the objective function is of maximization type, then the coefficient of the artificial variable in the objective function should by $-M$.
otherwise, it should be $+M$ where M is a very large value.

→ Rules in simplex method.

* To convert general to standard form

<= add a slack variable
>= subtract a surplus variable
= Nothing.

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# Big M method.

To convert general to standard form

<= add a slack variable (+s)

>= subtract a surplus variable (-s) and add an artificial variable

= Add an artificial variable.

## Artificial variable.

These variables are fictitious and have no physical meaning

They assume the role of slack variables in the first iteration, only to be replaced at a later iteration.

It is merely a device to get the starting basic feasible solution so that the simplex procedure may be applied as usual until the optimal solution is obtained.