

# [Using newton method of optimization](https://assignbuster.com/using-newton-method-of-optimization/)

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﻿Using Newton Method of Optimization
Consider the two equations
Given that the required volume V is 20m3 and side x is 4m and the cost of the vessel depends on the surface area. The problem is to minimize the surface area to reduce the cost of the vessel.
Write surface area S in terms of either h or b as follows: plug the values of volume and side in the volume equation to get an equation in terms of h and b and make h the subject. The resulting equation is . Insert the value of x and substitute for h in the surface area equation to obtain. Note that it is easier to substitute for h than b in the surface area equation. The surface area equation can also be written as.
To optimize S, differentiate it with respect to b to get. Again differentiate it to obtain. The Newton direction is

Let, then.

The iterations continue for resulting values of b until d equals zero. When the difference d gets to zero, all iterations ensuing it yield a constant value of b. The constant is the optimal solution. Denoting the subscript of b by k, the table below shows the iterations. The constant value of b has been obtained after three iterations.
Table 1
k
bk
0
1
1
1. 777971
2
1. 78881
3
1. 788854
4
1. 788854