

Answer on Question #60833 – Math – Algorithms | Quantitative Methods

Question

c) Obtain the cube root of 12 using Newton-Raphson formula.

Solution

Newton-Raphson method is used to find zeros of the equation

$$f(x) = 0.$$

In this problem we set

$$f(x) = x^3 - 12, \quad f'(x) = 3x^2, \quad x_0 = 1 ;$$

$$x_{n+1} = x_n - \frac{f(x_n)}{f'(x_n)} = x_n - \frac{x_n^3 - 12}{3x_n^2} = \frac{2}{3}x_n + \frac{4}{x_n^2}.$$

n	x_n	x_{n+1}
0	1	4.6666666666667
1	4.6666666666667	3.294784580499
2	3.294784580499	2.564996283934
3	2.564996283934	2.317973627725
4	2.317973627725	2.289778566912
5	2.289778566912	2.289428538628
6	2.289428538628	2.289428485107
7	2.289428485107	2.289428485107

So $\sqrt[3]{12} \approx 2.289428485107$.