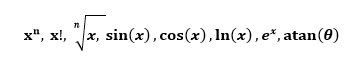
**Newton Raphson for Estimating the Cube Root of a Number**

**Introduction:**

Computers, microprocessors, and calculators can add, subtract, multiply, and divide. These operations are done in binary, of course, since numbers are stored in binary.

With this rather limited set of operations, how does your calculator or MATLAB determine values for these functions?



To calculate values for these functions, we need an iterative algorithm or a numerical method that only requires the basic arithmetic operations of addition, subtraction, multiplication, and division. The Newton Raphson method is one way to compute the cube root of a number.

**Cube Root of a Number**

The Newton Raphson algorithm can be used to find the cube root of a number:

1. Write a script that will find the cube root of a number using the algorithm shown above with the following specifications:

* Use input statements to prompt the user for the number he/she would like to find the cube root of and for an initial estimate of the cube root.
* Iterate through the algorithm until the Error <= 1e-9
* Use an fprintf statement to display the original number and the estimate for cube root of the number with 3 places behind the decimal point.
* Use an fprintf statement to display the total number of iterations required.

1. Now run your script to complete the table below.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Number** | **Estimate** | **Actual Cube Root** | **Program Output** | **Number of Iterations** |
| **29.85** | **1** |  |  |  |
| **216** | **1** |  |  |  |
| **2000000** | **1** |  |  |  |
| **2000000** | **20** |  |  |  |

1. Extra Challenge: Modify your script to save all of the estimates in an array (vector) and then plot all of the estimates.