

```
1 import components.simplereader.SimpleReader;
2
3
4
5
6 // DAVID PARK IS AUTHOR
7
8 public final class Newton3 {
9
10     private Newton3 () {}
11
12
13     private static double sqrt(double x, double relativeError) {
14
15         double guess = x;
16         double newGuess;
17
18         if (x == 0) {
19             return 0;
20         }
21
22         while (true) {
23             newGuess = 0.5 * (guess + x / guess);
24             if (Math.abs(newGuess - guess) < relativeError) {
25                 break;
26             }
27             guess = newGuess;
28         }
29         return guess;
30     }
31
32     /**
33      * Main method.
34      *
35      * @param args
36      *         the command line arguments
37      */
38     public static void main(String[] args) {
39         SimpleReader in = new SimpleReader1L();
40         SimpleWriter out = new SimpleWriter1L();
41
42         out.println("Enter the relative error: ");
43         double relativeError = in.nextDouble();
44
45         out.println(sqrt(16, relativeError));
46         out.println(sqrt(4, relativeError));
47         out.println(sqrt(81, relativeError));
48         out.println(sqrt(0, relativeError));
49
50         in.close();
51         out.close();
52     }
53
54 }
55
```