C++ code for the fixed point method

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Listing 1: Fixed point algorithm in C++

```
#include <iostream>
#include <cmath>
using namespace std;
long double f(long double x);
long double g(long double x);//defining side-efects
int main(void){
  cout << "Type de initial value, "
    << "then the tolerance and then iterations." <<
    " All of them separated by a space" << endl;
  long double x0=0, tol=0, iter=0, xn=0;
  cin >> x0 >> tol >> iter;
  long double y = f(x0);
  long double error = tol + 1;
  long long cont = 0;
  while(y!=0 and error>tol and cont < iter){
    xn = g(x0);
    y = f(xn);
    error = abs(xn - x0);
    x0 = xn;
    ++cont;
  }
  if(y == 0){
    cout << x0 << " is a root." << endl;
  }else if(error < tol){
    cout << x0 << " is a root with error="
      << error << endl;
  }else{
    cout << "couldn't find the root after " << iter
      << " iterations" << endl;
  }
}
long double f(long double x){
  return exp(-(x*x)+1) - 3*x*cos(x+4) - 5*x + 3;
```

```
34 }
35 long double g(long double x){
36   return x - ((exp(-(x*x)+1)-3*x*cos(x+4)-5*x+3)/
37     (-2*x*exp(-(x*x)+1) - 3*cos(x+4) + 3*x*sin(x+4) -5));
38 }
```