Changing Variables q4

# Revision history

V 1.0: initial release

# usage history

# problem description

In this drill you are going to compute the value of a rational expression using a program. The user must enter a value for x, and your program must output the value for y. Confirm that your code is correct by performing the same calculation by hand. The expression is:  
  
Did your output agree with what you computed by hand? What happens if you enter x =10?

# Solution

#include <iostream>

**using** **namespace** std**;**

int main**()**

**{**

double x**,** y**;**

cout **<<** "Enter a value for the variable x" **<<** endl**;**

cin **>>** x**;**

y **=** (2.0/3)\*(x+4)/(x-10)**; //Remember to avoid integer division!**

cout **<<** y**;**

**}**

Note: this function introduces potentially issues with integer division. If the student enters only 2/3, rather than 2.0/3 (or some other way to cast to a double), then they will encounter an error in that y = 0 for any input of x.

# suggested test cases

Some suggested test cases:

* Test x = 0, -1, 1
* Test x = M\_PI (requires #include <cmath>), or some other approximation of an irrational number.
* Testing x = 10 should produce a value of “inf” or “nan”, depending on the student’s computer, but the code still runs. This is known as a “silent failure”.

All student test cases should be confirmed by a hand calculation.

# required topics

* Using a computer to evaluate a mathematical function
* Design of good test cases
* Knowing if a computer is correct using hand computation
* Encountering divide by zero and silent failures