This exercise is designed for practicing with performing a computation that requires the use of if statements to solve it.

Write a C++ program that will prompt the user for the terms of the quadratic equation and compute the roots.   The quadratic equation is:

$$ax^2 + bx + c = 0$$

The roots are found using the formula:

$$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

PLANNING

1) You compute the two roots by using the + and then the – version of the formula above.
2) If a is 0 then this is a linear equation (bx + c = 0), so the only root would be -c / b.
3) If the value under the square root is 0, then the only root is -b/2a.
4) You may have 2 real roots or two roots that have an imaginary component. This happens when the value under the square root is negative. So $\sqrt{-4} = \sqrt{4}i$ which gives you -2i and 2i.
5) The cmath library has sqrt(x) to compute the square root of a non-negative number.

TIPS:

- When working with real numbers, do not try to compare a value to exactly 0.0. This is rarely true. It's better to check to see if it is very close to zero. For example:
    -0.000001 < a && a < 0.000001

- Don't try to throw all of the logic together at once. Decide how many possible paths you will have, and then work on each path, testing it until it works, prior to moving on to the next part of the solution.

SAMPLES

Below I have provided a few different sample executions of the program. You should check your results with other values as well. *User input is highlighted in yellow.*

```
Welcome to the roots calculator.
Enter values for a b and c, separated by spaces: 1 2 1
The single root of the equation is: -1.000
```

```
Welcome to the roots calculator.
Enter values for a b and c, separated by spaces: 1 0 -4
Your roots are: 2.000 AND -2.000
```

```
Welcome to the roots calculator.
Enter values for a b and c, separated by spaces: 1 2 -3
Your roots are: 1.000 AND -3.000
```

```
Welcome to the roots calculator.
Enter values for a b and c, separated by spaces: 1 -2 3
Your roots are: 1.000 + 1.414i AND 1.000 - 1.414i
```

GRADING NOTES

The following must be present for you to get full credit for the assignment:

- The program has a block comment in the beginning that includes:
    - Your name
    - The date
    - The course
    - The environment you tested it in (ex: Clion 2022 version, or VSCode with mingw64 g++)
    - A description of the problem being solved.
- Variables have meaningful names and are declared prior to the computations.
- Code is indented properly and easy to read.
- The program compiles and executes correctly as described in the assignment. The correct results are output and the report is formatted as asked for. Programs that do not compile or execute without crashing will receive no credit.