Practice Exercise #24: Finding a Root of a Quadratic Equation

http://www.comp.nus.edu.sg/~cs1020/4_misc/practice.html

Objective:

- Indicating and throwing exceptions and handling exceptions.

Task Statement

You are given an incomplete Java program consisting of the following file:

- **`QuadraticRoot.java`**

You are to complete the program to read in three numbers from the input (as the coefficients *A*, *B* and *C* of a quadratic equation $Ax^2 + Bx + C = 0$), and compute the larger of the roots of the equation.

In the **`main()`** method, you should call the class method **`findBigRoot()`** to compute the larger of the roots of the quadratic equation, passing *A*, *B* and *C* as arguments to the function. The **`main()`** method must check for and handle the possible **`IllegalArgumentException`** thrown by the **`findBigRoot()`** method. Refer to the instructions in **`QuadraticRoot.java`** for more details on this task. **`IllegalArgumentException`** is predefined in the Java library, so you need not define the class yourself.

The **`findBigRoot()`** method returns the larger of the roots of the quadratic equation, given the coefficient *A*, *B* and *C*. However, if coefficient *A* equals 0 or the discriminant is negative, then the method must throw an **`IllegalArgumentException`**. Refer to the instructions in **`QuadraticRoot.java`** for more details on this task.

(Hint: In the **`main()`** method, you can use a **`return`** statement to terminate the program.)

Sample Input #1

```
1.5 8.0 2.0
```

Sample Output #1

```
Finding the larger root of quadratic equation
Ax^2 + Bx + C = 0.
Enter coefficients A, B and C:
The larger root is -0.263.
```

Sample Input #2

```
0.0 9.0 -1.0
```

Sample Output #2

```
Finding the larger root of quadratic equation
Ax^2 + Bx + C = 0.
Enter coefficients A, B and C:
Cannot find root.
findBigRoot(): Coefficient A is zero.
```

Sample Input #3

```
0.5 6.0 -1.5
```

Sample Output #3

```
Finding the larger root of quadratic equation
Ax^2 + Bx + C = 0.
Enter coefficients A, B and C:
The larger root is 0.245.
```

Sample Input #4

```
2.5 3.0 10.0
```

Sample Output #4

```
Finding the larger root of quadratic equation
Ax^2 + Bx + C = 0.
Enter coefficients A, B and C:
Cannot find root.
findBigRoot(): Discriminant is negative.
```

Sample Input #5

```
2.0 4.0 2.0
```

Sample Output #5

```
Finding the larger root of quadratic equation
Ax^2 + Bx + C = 0.
Enter coefficients A, B and C:
The larger root is -1.000.
```