

Python – Quadratic

Purpose

This lab was designed to teach you how to use decision structures to solve a problem.

Description

Given numbers a , b , and c , the quadratic equation $ax^2+bx+c=0$ can have zero, one or two real solutions (i.e; values for x that satisfy the equation). The expression b^2-4ac is the *discriminant* associated with the equation. If the discriminant is positive, the equation has two solutions. If the discriminant is zero, the equation has one solution. Finally, if the discriminant is negative, the equation has no solutions. Implement a Python function `smaller_root` that takes as input the numbers a , b and c and returns the **smaller solution** to this equation if one exists. If the equation has no real solution, print the message "**Error: No real solutions**" and simply returns. Note that, in this case, the function will return the special Python value **None**.

$$x = \frac{-b \pm \sqrt{b^2 - 4 \cdot a \cdot c}}{2 \cdot a}$$

Program Shell

`quadratic.py` provided for you

Sample Data

```
1 2 3
2 0 -10
6 -3 5
1 0 0
```

Sample Execution

```
The smaller root of 1x^2 + 2x + 3 is:
Error: No real solutions
None

The smaller root of 2x^2 + 0x + -10 is:
-2.23606797749979

The smaller root of 6x^2 + -3x + 5 is:
Error: No real solutions
None

The smaller root of 1x^2 + 0x + 0 is:
Only one solution
0.0
```