

2.1.1. Roots of a Quadratic Equation

Write a program to find the roots of a quadratic equation, given its coefficients a , b , and c . Use the quadratic formula:

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

The discriminant $D = b^2 - 4ac$ determines the nature of the roots:

- If $D > 0$: Roots are real and different
- If $D = 0$: Roots are real and the same
- If $D < 0$: Roots are imaginary

Input Format:

- Three space-separated integers representing the coefficients a , b , and c , respectively.

Output Format:

- If roots are real and different, print:

```
root1 = <Root1>
root2 = <Root2>
```

- If roots are the same, print:

```
root1 = root2 = <Root1>
```

- If roots are imaginary, print:

```
root1 = <RealPart>+<ImaginaryPart>i
root2 = <RealPart>-<ImaginaryPart>i
```

- All values should be formatted to two decimal places.

```

1 import math
2 a, b, c = map(int, input().split())
3 D = b * b - 4 * a * c
4 if D > 0:
5     root1 = (-b + math.sqrt(D)) / (2 * a)
6     root2 = (-b - math.sqrt(D)) / (2 * a)
7     print(f"root1 = {root1:.2f}")
8     print(f"root2 = {root2:.2f}")
9
10 elif D == 0:
11     root = -b / (2 * a)
12     print(f"root1 = root2 = {root:.2f}")
13
14 else:
15     real_part = -b / (2 * a)
16     imaginary_part = math.sqrt(-D) / (2 * a)
17     print(f"root1 = {real_part:.2f}+{imaginary_part:.2f}i")
18     print(f"root2 = {real_part:.2f}-{imaginary_part:.2f}i")

```

1 -5 6
root1 = 3.00
root2 = 2.00
===== YOUR PROGRAM HAS ENDED =====

Start

Input: Read three integers (a , b , and c) from a single line of input.

Calculate Discriminant: Compute D using the formula: $D = b^2 - 4ac$

- **If $D > 0$ (Real and Different):**
 - Calculate $\text{root1} = \frac{-b + \sqrt{D}}{2a}$
 - Calculate $\text{root2} = \frac{-b - \sqrt{D}}{2a}$
 - Print both roots.
- **If $D = 0$ (Real and Same):**
 - Calculate the single root: $\text{root} = \frac{-b}{2a}$
 - Print that $\text{root1} = \text{root2}$ equals this value.
- **If $D < 0$ (Imaginary/Complex):**
 - Calculate the **Real Part**: $\frac{-b}{2a}$
 - Calculate the **Imaginary Part**: $\frac{\sqrt{-D}}{2a}$
 - Print the roots in the complex format (e.g., $\text{real} + \text{imaginary } i$).

Formatting: Ensure all printed values are formatted to exactly **two decimal places**.

