

## 2.1.1

The screenshot shows the CodeTantra IDE interface. The left panel displays a problem statement and sample code. The right panel shows the code editor, execution results, and test cases.

**Problem Statement:**

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:

**Sample Test Cases**

**Code Editor (quadratic...):**

```
import math
a, b, c = map(int, input().split())
D = b * b - 4 * a * c
if D > 0:
    root1 = (-b + math.sqrt(D)) / (2 * a)
    root2 = (-b - math.sqrt(D)) / (2 * a)
    print("root1 = {:.2f}\nroot2 = {:.2f}".format(root1, root2))
elif D == 0:
    root1 = root2 = (-b) / (2 * a)
    print("root1 = root2 = {:.2f}".format(root1))
else:
    print("No real roots")
```

**Execution Results:**

Average time: 0.012 s | Maximum time: 0.015 s  
12.17 ms | 15.00 ms

3 out of 3 shown test case(s) passed | 3 out of 3 hidden test case(s) passed

**Test Case 1** | **Test Case 2**

Expected output	Actual output
1 -5 6	1 -5 6
root1 ~ -3.00	root1 ~ -3.00
root2 ~ 2.00	root2 ~ 2.00

**Terminal** | **Test cases**

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# Algorithm

Step 1: Start

Step 2: Input the values of  $a$ ,  $b$ , and  $c$

Step 3: Calculate the discriminant  $D = b^2 - 4ac$

Step 4: If  $D > 0$ , print “Two different real roots”

Step 5: If  $D = 0$ , print “Two equal real roots”

Step 6: If  $D < 0$ , print “No real roots”

Step 7: Stop

## Flowchart

