**EXERCISE 1**

**NAME:** Nguyễn Minh Nhựt **STUDENT CODE:** 3122411144

**I. VERIFICATION AND VALIDATION**A screenshot of a computer

AI-generated content may be incorrect.

System 1:

DELTA but there is no shown computation of DELTA (undefined variable).

The formulas caculate x1, x2 are written wrongly.

System 2:

There is no handling for the case when DELTA is negative.

**II. TEST-CASES**

1. **There are 4 test cases:**

A close-up of a computer code

AI-generated content may be incorrect.

Test case 1: x > 10 **(15)**

Test case 2: x = 10 **(10)**

Test case 3: x < 10 **(4)**

Test case 4: x < 0 **(-3)**

1. **There are 5 test cases:**

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AI-generated content may be incorrect.

Test case 1: x = 10 **(10)**

Test case 2: x = 0 **(0)**

Test case 3: x > 10 **(11)**

Test case 4: 0 < x < 10 **(3)**

Test case 5: x < 0 **(-4)**

1. **There are 4 test cases:**

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AI-generated content may be incorrect.

Test case 1: x = 10 **(10)**

Test case 2: x = 2 **(2)**

Test case 3: x > 10 **(11)**

Test case 4: 2 < x < 10 **(3)**

Test case 5: x < 2 **(-4)**

1. **There are 3 test cases:**

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Test case 1: x = 0

Test case 2: x = 90

1. **There are test cases:**

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Test case 1: num1 != num2 != num3; num1, num2, num3 > 0 **(2, 3, 5)**

Test case 2: num1 = num2 = num3 **(3, 3, 3)**

Test case 3: num1 < 0 && num2, num3 > 0 **(-2, 3, 5)**

Test case 4: num 2 < 0 && num1 = num3 > 0 **(1, -4, 1)**

Test case 5: num 3 = 0 && num1, num2 > 0 **(1, 3, 0)**

Test case 6: num1 != num2 != num3; num1, num2, num3 < 0 **(-5, -2, -7)**

Test case 7: num1 = num2 < 0 **(5, 5, 1)**

Test case 8: num1, num3 < 0 && num2 > 0 **(-2, 5, -3)**

Test case 9: num2, num3 < 0 && num2 = num3 **(4, -3, -3)**

**III. PRATICE 1**

* This is a function that solves the Quartic formula.
* **Input**: a, b, c are real coefficients.

x[] is the output array contains the real solutions of the equation.

* **Ouput**: The number of real solutions found.

**Test cases:**

Test case 1: a = 0, b = 0, c = 0 → Expected: Infinite solutions

Test case 2: a = 0, b = 0, c = 5 → Expected: No solutions

Test case 3: a = 0, b = 2, c = -8 → Expected: 2, x = (2,-2)

Test case 4: a = 1, b = 0, c = -4 → Expected: 2, x = ±√2

Test case 5: a = 1, b = 2, c = 1 → Expected: No solutions

Test case 6: a = 1, b = -5, c = 4 → Expected: 4 x = (±1,±2)