

➤ Develop a Java program that prints all real solutions to the quadratic equation $ax^2 + bx + c = 0$. Read a, b, c and use the quadratic formula. If the discriminant $b^2 - 4ac$ is negative, display a message stating that there are no real solutions.

```
import java.util.Scanner;
```

```
class Quadratic
```

```
{
```

```
    int a, b, c;
```

```
    double r1, r2, d;
```

```
    void getd()
```

```
    {
```

```
        Scanner s = new Scanner(System.in);
```

```
        System.out.println("Enter the coefficients of a, b, c");
```

```
        a = s.nextInt();
```

```
        b = s.nextInt();
```

```
        c = s.nextInt();
```

```
    }
```

```
    void compute()
```

```
    {
```

```
        while (a == 0)
```

```
        {
```

```
            System.out.println("Not a quadratic equation");
```

```
            System.out.println("Enter a non zero value for a");
```

```
            Scanner s = new Scanner(System.in);
```

```
            a = s.nextInt();
```

```
        }
```

```
        d = b * b - 4 * a * c;
```

```
        if (d == 0)
```

```
        {
```

```
            r1 = (-b) / (2 * a);
```

```
            System.out.println("Roots are real and equal");
```

```
            System.out.println("Root 1 = Root 2 = " + r1);
```

```
        }
```

else if (d > 0)

{

$x1 = ((-b) + (\text{Math.sqrt}(d))) / (\text{double})(2 * a);$

$x2 = ((-b) - (\text{Math.sqrt}(d))) / (\text{double})(2 * a);$

System.out.println("Roots are real and distinct");

System.out.println("Root1 = " + x1 + "Root2 = " + x2);

}

else if (d < 0)

{

System.out.println("Roots are imaginary");

$x1 = (-b) / (2 * a);$

$x2 = \text{Math.sqrt}(-d) / (2 * a);$

System.out.println("Root 1 = " + x1 + " + i " + x2);

System.out.println("Root 1 = " + x1 + " - i " + x2);

}

}

}

class QuadraticMain

{

public static void main(String args[])

{

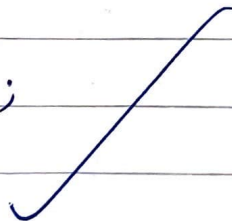
Quadratic q = new Quadratic();

q.getd();

q.compute();

}

}



Output:

Enter the coefficients of a,b,c:

1 2 1

Roots are real and equal

Root 1 = Root 2 = -1.0

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Enter the coefficients of a,b,c:

3 4 5

Roots are Imaginary

Root 1 = $0.0 + i1.10554159678$

Root 2 = $0.0 - i1.10554159678$

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Enter the coefficients of a,b,c:

1 3 2

Roots are real and Distinct

Root 1 = -1.0 Root 2 = -2.0

Done by: Santosh Tambagi

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