

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

## Quadratic Equation

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

```
public class QuadraticSolver {  
    public static void main(String[] args) {
```

```
        System.out.print("Enter coefficient a:");  
        double a = scanner.nextDouble();  
        System.out.print("Enter coefficient b:");  
        double b = scanner.nextDouble();  
        System.out.print("Enter coefficient c:");  
        double c = scanner.nextDouble();  
        double discriminant =  $b*b - 4*a*c$ ;  
        if (discriminant > 0) {  
            double root1 =  $(-b + \text{Math.sqrt}(\text{discriminant})) / (2*a)$ ;  
            double root2 =  $(-b - \text{Math.sqrt}(\text{discriminant})) / (2*a)$ ;  
            System.out.print("Roots are real and different");  
        }
```

```
        else if (discriminant == 0) {  
            double root =  $-b / (2*a)$ ;
```

```
            System.out.print("Roots are real and same, root");
```

```
        } else {
```

```
            double real part =  $-b / (2*a)$ ;  
            double imaginary part =  $\text{Math.sqrt}(-\text{discriminant}) / (2*a)$ ;
```

```
            System.out.print("Roots are complex and different | n Root 1 =  $\% .2f + \% .2fi$  n  
Root 2 =  $\% .2f - \% .2fi$ ");
```

```
}  
Scanner.close()  
}  
}
```

Output: → Enter Coefficient a : 12  
Enter Coefficient b : 13  
Enter Coefficient c : 14  
Roots are complex and different  
Root 1 =  $-0.54 + 0.93i$   
Root 2 =  $-0.54 - 0.93i$

Enter coefficient a : 2  
Enter coefficient b : 1  
Enter coefficient c : 0  
Roots are real and distinct  
Root 1 = 0.00  
Root 2 = -0.50

Enter coefficient a : 1  
Enter coefficient b : 2  
Enter coefficient c : 1  
Roots are real and same  
Root = -1.0