

QUESTION: - 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 the quadratic formula. If the discriminate b^2-4ac is negative, display a message stating that there are no real solutions.

ANSWER: -

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

```
import java.lang.Math;
```

```
class Quadratic{
```

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

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

```
        //Input values of a, b and c
```

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

```
        System.out.print("a = ");
```

```
        double a=s.nextDouble();
```

```
        System.out.print("b = ");
```

```
        double b=s.nextDouble();
```

```
        System.out.print("c = ");
```

```
        double c=s.nextDouble();
```

```
        //discriminant id D here
```

```
        double D = b*b-4*a*c;
```

```
        double root1,root2;//Roots of the equation
```

```
        //if the discriminant is positive
```

```
        if(D>0){
```

```
            System.out.println("Roots are Real and Unique");
```

```
            //Two real and Unique solutions
```

```
            root1=(-b+Math.sqrt(D)/(2*a));
```

```
            root2=(-b-Math.sqrt(D)/(2*a));
```

```
            System.out.println("Root1= "+root1+" AND "+Root2= "+root2);
```

```
        }
```

```

//if discriminant equal to zero
else if(D==0){
    System.out.println("Roots are Real and Equal");
    //Real and Equal solutions
    root1=root2=-b/(2*a);
    System.out.println("Root1=Root2= "+root1);
}
//if discriminant is negative
else{
    System.out.println("There is no real solution");
    //Two imaginary solutions
    double realpart=-b/(2*a);
    double imagpart=Math.sqrt(-D)/(2*a);
    System.out.println("Root1= "+realpart+"+"+imagpart+"i"+" AND "+ "Root2=
"+realpart+"-"+imagpart+"i");
}

}

}

```

```

a Command Prompt
Microsoft Windows [Version 10.0.22000.1219]
(c) Microsoft Corporation. All rights reserved.

C:\Users\BMSCECSE>cd C:\Users\BMSCECSE\Desktop\1BM21CS233
C:\Users\BMSCECSE\Desktop\1BM21CS233>set path = C:\Program Files\Java\jdk-19\bin
C:\Users\BMSCECSE\Desktop\1BM21CS233>javac QUAD.java
C:\Users\BMSCECSE\Desktop\1BM21CS233>java Quadratic
Enter the values of a, b and c
a = 4
b = 2
c = 1
There is no real solution
Root1= -0.25+0.4330127018922193i AND Root2= -0.25-0.4330127018922193i

C:\Users\BMSCECSE\Desktop\1BM21CS233>
C:\Users\BMSCECSE\Desktop\1BM21CS233>java Quadratic
Enter the values of a, b and c
a = 2
b = -11
c = 14
Roots are Real and Unique
Root1= 11.75 AND Root2= 10.25

C:\Users\BMSCECSE\Desktop\1BM21CS233>java Quadratic
Enter the values of a, b and c
a = 1
b = -10

```

```

ja Command Prompt
jaRoot1= -0.25+0.4330127018922193i AND Root2= -0.25-0.4330127018922193i

C:\Users\BMSCECSE\Desktop\1BM21CS233>
C:\Users\BMSCECSE\Desktop\1BM21CS233>java Quadratic
Enter the values of a, b and c
a = 2
b = -11
c = 14
Roots are Real and Unique
Root1= 11.75 AND Root2= 10.25

C:\Users\BMSCECSE\Desktop\1BM21CS233>java Quadratic
Enter the values of a, b and c
a = 1
b = -10
c = 25
Roots are Real and Equal
Root1=Root2= 5.0

C:\Users\BMSCECSE\Desktop\1BM21CS233>
/
i

```

