

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 discriminant $b^2 - 4ac$ is negative, display a message stating that there are no real solutions.

LAB - 1:

Algorithm:-

Step 1:- Input the values of a, b and c

Step 2:- Calculate using formula

$$d = (b * b) - (4 * a * c)$$

Step 3:- If $(d < 0)$

Print: No real solutions

else if $(d = 0)$

Print: Roots are equal

Print: $x_1 = x_2 = (-b/2a)$

else

Print: Roots are real

Print: $x_1 = (-b + \sqrt{d}) / (2 * a);$

Print: $x_2 = (-b - \sqrt{d}) / (2 * a);$

Step 4:- End

```
Import java.util.*;
```

```
Public class main
```

```
{
```

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

```
double a, b, c, d, x1, x2;
```

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

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

```
a = sc.nextDouble();
```

```
b = sc.nextDouble();
```

```
c = sc.nextDouble();
```

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

```
if (d > 0)
```

```
{
```

```
    x1 = (-b + math.sqrt(d)) / (2 * a);
```

```
    x2 = (-b - math.sqrt(d)) / (2 * a);
```

```
    System.out.println("Root 1 = " + x1 + " Root 2 = " + x2);
```

```
}
```

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

```
{
```

```
    x1 = x2 = -b / (2 * a);
```

```
    System.out.println("Root 1 = Root 2 = " + x1);
```

```
}
```

```
else
```

```
{
```

```
    System.out.println("There are no real solutions for  
the given equation");
```

```
}
```

```
}}
```

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Language Java

Main.java

```
1 import java.util.*;
2 public class Main
3 {
4     public static void main(String[] args) {
5
6         double a,b,c,d,r1,r2;
7         System.out.println("Enter the values of a,b and c");
8         Scanner sc = new Scanner(System.in);
9         a = sc.nextDouble();
10        b = sc.nextDouble();
11        c = sc.nextDouble();
12        d=(b*b)-(4*a*c);
13        if(d>0)
14        {
15            r1=(-b+Math.sqrt(d))/(2*a);
16            r2=(-b-Math.sqrt(d))/(2*a);
17            System.out.println("Root1="+r1+"Root2="+r2);
18        }
19        else if(d==0)
20        {
21            r1=r2=-b/(2*a);
22            System.out.println("Root1=Root2="+r1);
23        }
24        else
25        {
26            System.out.println("There are no real solutions for the given equation");
27        }
28    }
29 }
```

input

Press ENTERED to exit console

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Language Java

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Main.java

```
1 import java.util.*;
2 public class Main
3 {
4     public static void main(String[] args) {
5
6         // ...
7     }
8 }
```

input

Enter the values of a,b and c
1
1
1
There are no real solutions for the given equation

...Program finished with exit code 0
Press ENTER to exit console.

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Language Java

Main.java

```
1 import java.util.*;
2 public class Main
3 {
4     public static void main(String[] args) {
5         // ...
6     }
7 }
```

input

Enter the values of a,b and c

1

-2

1

Root1=Root2=1.0

...Program finished with exit code 0

Press ENTER to exit console.