

1. 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.

```
import java.io.*;
import java.util.*;
import java.lang.*;
public class quadratic
{
    private static double a;
    private static double b;
    private static double c;
    public static void read()
    {
        Scanner sc=new Scanner(System.in);
        System.out.println("Enter the Co-Efficient a");
        a=sc.nextDouble();
        System.out.println("Enter the Co-Efficient b");
        b=sc.nextDouble();
        System.out.println("Enter the Co-Efficient c");
        c=sc.nextDouble();
        System.out.println("THANK YOU FOR ENTERING THE CO-EFFICIENTS");
    }
    public static void calc()
    {
        read();
        double d=b*b-4*a*c;
        if(d>0)
        {
            System.out.println("ROOTS ARE REAL AND DISTINCT");
            System.out.println("FIRST ROOT IS " + (-b+Math.sqrt(d))/(2*a));
            System.out.println("FIRST ROOT IS " + (-b-Math.sqrt(d))/(2*a));
        }
        else if(d==0)
        {
            System.out.println("Roots are equal");
            System.out.println("ROOTS ARE " + (-b)/(2*a));
        }
        else
        {
            System.out.println("ROOTS ARE IMAGINARY");
            System.out.println("ROOTS ARE " + -b/(2*a) + "+" + "i" + (Math.sqrt(-d))/(2*a));
            System.out.println("ROOTS ARE " + -b/(2*a) + "-" + "i" + (Math.sqrt(-d))/(2*a));
        }
    }
}
```

```

}
}
public static void main(String[] args)
{
    calc();
}
}

```

output:



The screenshot shows a terminal window titled "1: Java Debug Console". The terminal output is as follows:

```

/Contents/Home/bin/java -agentlib:jdwp=transport=dt_socket,server=n,suspend=y,address=localhost:5
6235 --enable-preview -XX:+ShowCodeDetailsInExceptionMessages -Dfile.encoding=UTF-8 -cp "/Users/a
dityaparaksha/Library/Application Support/Code/User/workspaceStorage/cfbc9c7f24e20b2c0e1ac38bf24b
d34d/redhat.java/jdt_ws/java_895310d3/bin" quadratic
Enter the Co-Efficient a
2
Enter the Co-Efficient b
3
Enter the Co-Efficient c
4
THANK YOU FOR ENTERING THE CO-EFFICIENTS
ROOTS ARE IMAGINARY
ROOTS ARE -0.75+i1.1989578808281798
ROOTS ARE -0.75-i1.1989578808281798
bash-5.0$

```

**2. Develop a Java program to create a class Student with members usn, name, an array credits and an array marks. Include methods to accept and display details and a method to calculate SGPA of a student.**

```

import java.util.Scanner;
class Student
{
    private String USN;
    private String name;
    private int n;
    private double SGPA = 0;
    private int totalCredits = 0;
    private int credits[];
    private double marks[];
    Scanner ss = new Scanner(System.in);

    void Details()

```