Lab program 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.util.Scanner;
import java.lang.Math;
class QE
{
    Scanner S = new Scanner(System.in);
    int a, b, c;
    double d, R1, R2;
    void input()
    {
        System.out.println("Enter values of a, b, c:");
        a = S.nextInt();
        b = S.nextInt();
        c = S.nextInt();
    }
void calculate()
    {
        if (a==0)
        {
            System.out.println("Not a Quadratic equation\n
                    Enter value of a:");
            a = S.nextInt();
        }
        d = (b*b) - (4*a*c);
        if (d<0)
        {
            System.out.println("Roots are imaginary");
            R1 = (-b)/(2*a);
            R2 = Math.sqrt(-d)/(double)(2*a);
            System.out.println("R1 = "+R1+" R2 = "+R2);
        }
```

```
else if (d == 0)
{
    System.out.println("Roots are real and equal");
    r1 = (-b)/(double) (2*a);
    r2 = r1;
    System.out.println("R1 = " + r1 + "R2 = " r2);
}
else
{
    System.out.println("Roots are real and distinct");
    r1 = ((-b) + (Math.sqrt(d)))/(double) (2*a);
    r2 = ((-b) - (Math.sqrt(d)))/(double) (2*a);
    System.out.println("R1 = " + r1 + " R2 = " + r2);
}
}
}
class Quadratic
{
    public static void main (String a[]){
    { QE q = new QE();
      q.input();
      q.calculate();
    }
}
```

Output:

Enter values of a, b, c:
10
20
5
Roots are real and distinct
R1 = -1.7071067811865475 R2 = 0.0

Enter values of a, b, c:
5
3
1
Roots are imaginary
R1 = 0.0 R2 = 0.3316624790355997

Enter values of a, b, c:
4
4
1
Roots are real and equal
R1 = -0.5 R2 = -0.5

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