```
Lab Program 1:
```

Develop a Java program that prints all real solutions to the quadratic equation ax2+bx+c=0. Read in a, b, c and use the quadratic formula. If the discriminate b2

-4ac is negative, display a message stating that there are no real solutions.

## Code:

```
import java.util.Scanner;
import java.lang.Math;
class qe
{
 public static void main(String xx[])
{
 Scanner s=new Scanner (System.in);
 double a,b,c,d,r1,r2;
 System.out.println("Enter values of a,b and c");
 a=s.nextDouble();
 b=s.nextDouble();
 c=s.nextDouble();
 if(a==0)
 { System.out.println("a shouldn't be 0");}
 else
 d=(b*b)-(4*a*c);
 if(d>0)
 {
  System.out.println("Roots are real and distinct");
  r1 = (-b + Math.sqrt(d))/(2*a);
  r2=(-b-Math.sqrt(d))/(2*a);
```

```
System.out.print("R1:"+r1+" R2:"+r2);
  }
else if(d==0)
  {
  System.out.println("Roots are real and equal");
  r1=(-b)/(2*a);
  System.out.println("Roots are "+r1);
  }
else
   { System.out.println("Roots are imaginary");
   r1=(-b)/(2*a);
   r2=Math.sqrt(Math.abs(d))/(2*a);
   System.out.println("R1:"+r1+"+i"+r2+" R2:"+r1+"-i"+r2);
   }
}
}
}
```

## Outputs:

```
Command Prompt
                                                                                                                               П
                                                                                                                                    ×
Microsoft Windows [Version 10.0.19045.2251]
(c) Microsoft Corporation. All rights reserved.
C:\Users\bmsce>cd C:\Users\bmsce\Desktop\1BM21CS047\week-1
C:\Users\bmsce\Desktop\1BM21CS047\week-1>javac qe.java
C:\Users\bmsce\Desktop\1BM21CS047\week-1>java qe
Enter values of a,b and c
 20 30
 shouldn't be 0
C:\Users\bmsce\Desktop\1BM21CS047\week-1>java qe
Enter values of a,b and c
1 2 1
Roots are real and equal
Roots are -1.0
C:\Users\bmsce\Desktop\1BM21CS047\week-1>java qe
Enter values of a,b and c
 loots are imaginary
C:\Users\bmsce\Desktop\1BM21C5047\week-1>java qe
Enter values of a,b and c
153
R0ots are real and distinct
R1:-0.6972243622680054 R2:-4.302775637731995
 :\Users\bmsce\Desktop\1BM21CS047\week-1>
```

```
Select Command Prompt

Microsoft Windows [Version 10.0.19045.2251]

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U(c) Wicrosoft Corporation.
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of 1. Brogsom to find the roots of quadrante aquation
                                                                   Output :
  import java , util . Scanner;
                                                                   Enter values of a, b and c
  import jova long mouth;
                                                                    0 20 30
 Ctass qe
                                                                   a Shouldn't be O.
       public static void main ( String xx ( ))
                                                                   Enter values of C1,6 and C
          Scanner S: new Scanner (Sytem. in);
                                                                    1 2 1
          double a, b, c, d, or, or;
                                                                    Roots are real and equal.
         Systemicul printer ("Enter value of a, b and c");
a = s. nert Double(1;
                                                                   Roots are -1.0
                                                                   Enter values of a, bound c.
         b = s. nent Double ();
c = s. nent Double ();
                                                                   1 2 3
         14 (0==01
          f System. out println (" a shouldn't be o"); 3
                                                                   Roots are imaginary.
R1: -1.0+11.4142135623230471 122:-1.0-81.4142135623230451
                                                                   Enter values of a, b and c
                                                                    1200ts are real and distinct
             d=(b+b)-(ana+c);
                                                                     R1: -0.6972243622680054 R2: -4.302775637731995
            12 (0 >0)
      Systemous printin ("Root are real and distinct");
                                                                      De gulan
              TI = (-b+ Math. sqrt(d)) / (2+a);
TL = (-b- Math. sqr+(d)) / (2+a);
              System. ous. printer ("21: "+81+" 22: "+82);
          else 12 (d==0)
           Systemous. printer ('Rooks are real and equal');
             81: (-b)/(2xa);
System.out. privata (" roots are "+31);
       System and println("Roots are imaginary");

81= (-6)/(lical);

1 = Moth syst(Maxt.abs(d))/(sra);
```