

b) Write a java program that display the roots of a quadratic equation  $ax^2+bx=0$ . Calculate the discriminate D and basing on value of D, describe the nature of root.

```

class quadraticroots
{
    public static void main(String[] args)
    {
        Double a= Double.parseDouble(args[0]);
        Double b= Double.parseDouble(args[1]);
        Double c= Double.parseDouble(args[2]);
        double d= (b*b)- (4*a*c);
        if(d>0)
        {
            double root1=(-b+Math.sqrt(d))/(2*a);
            double root2= (-b-Math.sqrt(d))/(2*a);
            System.out.println("First Root is :" +root1);
            System.out.println("Second Root is :" +root2);
        }
        else if(d==0)
        {
            double root = -b/(2*a);
            System.out.println("Roots are REAL and EQUAL");
            System.out.println("Root value is " +root);
        }
        else
        {
            System.out.println("Roots are COMPLEX and IMAGINARY");
        }
    }
}

```

**Test Cases:**

Test Case 1: Real and Distinct Roots (D > 0)	Test Case 2: Real and Equal Roots (D = 0)	Test Case 3: Complex (Imaginary) Roots (D < 0)
a = 1 b = -5 c = 6  $D = (-5)^2 - 4 \times 1 \times 6 = 25 - 24 = 1$  Discriminant (D) = 1  Roots are REAL and DISTINCT Root 1 = 3.0 Root 2 = 2.0	a = 1 b = -4 c = 4  $D = (-4)^2 - 4 \times 1 \times 4 = 16 - 16 = 0$  Discriminant (D) = 0  Roots are REAL and EQUAL Root = 2.0	a = 1 b = 2 c = 5  $D = (2)^2 - 4 \times 1 \times 5 = 4 - 20 = -16$  Discriminant (D) = -16  Roots are COMPLEX and IMAGINARY Root 1 = -1.0 + i2.0 Root 2 = -1.0 - i2.0