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Page No. 9
Date: / /

Quadratic Equation Program

```
import java.util.Scanner;
import static java.lang.Math.sqrt;
import static java.lang.Math.abs;

public class quad {
    public static void main (String[] args){
        Scanner in = new Scanner (System.in);
        System.out.println ("Enter coefficients: ");
        int a = in.nextInt();
        int b = in.nextInt();
        int c = in.nextInt();
        if (a==0) {
            System.out.println ("Invalid input");
        }
        else {
            int d= b*b - 4*a*c;
            if (d>0) {
                System.out.println ("Roots are real");
                float r1=(float)(-b + sqrt(d))/(2*a);
                float r2=(float)(-b - sqrt(d))/(2*a);
                System.out.println (r1);
                System.out.println (r2);
            }
        elseif (d<0){
            System.out.println ("Roots are imaginary
            There are no real solutions");
            float r1= (float) -b/(2*a);
            float r2 = (float) sqrt (abs(d))/(2*a);
            System.out.println (r1 +"+i" + r2);
            System.out.println (r1+ "-i" +r2);
        }
```

```
        else {
            System.out.println("Roots are equal");
            float r = (float) -b/(2*a);
            System.out.println(r);
        }
    }
}
}
```

O/p (i) Enter coefficients: 0 1 1
Invalid Input

(ii) Enter coefficients: 1 2 1
Roots are equal: -1

(iii) Enter coefficients: 1 -6 5
Roots are real: 5 1

(iv) Enter coefficients: 5 1 5
Roots are imaginary. There are no real solutions.
-0.1 + i0.99498737 -0.1 - i0.99498737

Algorithm:
Step 1: Start
Step 2: initialise variable a,b,c,d & read a,b,c
Step 3: if (a=0) print "invalid input" goto Step 8.
Step 4: d = b*b - 4*a*c
Step 5: if d>0
print "roots are real"
r1 = (-b + sqrt(d))/(2*a)
r2 = (-b - sqrt(d))/(2*a)
print (r1, r2) goto step 8.
Step 6: if d<0
print ("Roots are imaginary
There are no real solutions")
r1 = -b/(2*a);

r2 = sqrt(abs(d)) / (2*a)
print (r1 + i r2)
print (r1 - i r2) goto step8.

Step 7: if d=0
print "Roots are equal"
r = -b/(2*a)
print r

Step 8: Stop.

Flowchart: