

PROGRAM - 1

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P1

WAP that prints all real solutions to the quadratic equations $ax^2 + bx + c = 0$. Read in a, b, c and use the quadratic formula. If the discriminant $b^2 - 4ac$ is negative, display a real message stating that there are no real solutions.

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→ public class QuadraticEquation {
    public static void main (String [] args) {
        float a, b, c, d;
        double r1, r2;
        Scanner Scan = new Scanner (System.in);
        System.out.println ("Enter the coefficients");
        a = Scan.nextFloat();
        b = Scan.nextFloat();
        c = Scan.nextFloat();
        d = b * b - 4 * a * c; if (a == 0) {System.out.println ("Invalid input");}
        else {if (d > 0)
            {
                System.out.println ("Roots are Real and distinct");
                r1 = (-b + Math.sqrt(d)) / (c * a);
                r2 = (-b - Math.sqrt(d)) / (c * a);
                System.out.println ("root 1 = " + r1 + "root 2 = "
                    + r2); }
            else if (d == 0)
                System.out.println ("Roots are real and equal");
            r1 = r2 = -b / (c * a); }
        System.out.println ("root1 = root2 = " + r1); }
    
```

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else {
    System.out.println ("Roots are imaginary");
    r1 = -b / (2 * a);
    r2 = -Math.sqrt (-d) / (2 * a);
    System.out.println ("root1 = " + r1 + " + " + r2);
    System.out.println ("root2 = " + r2 + " + " + r1);
}

```

Algorithm

Step 1: Start

Step 2: Initialise variables a, b, c, d and read
 a, b, c, d

Step 3: if ($a == 0$) print "invalid input"

Step 4: $d = b^2 - 4 * a * c$

Step 5: if $d > 0$
 print "roots are real"
 $r_1 = (-b + \sqrt{d}) / (2 * a)$
 $r_2 = (-b - \sqrt{d}) / (2 * a)$

Step 6: if $d < 0$
 print "Roots are imaginary. There
 are no real solutions")

~~$r_1 = -b / (2 * a);$~~

~~$r_2 = \sqrt{abs(d)} / (2 * a)$~~

~~print ($r_1 + ir_2$)~~

~~print ($r_1 - ir_2$)~~

Step 7: if $d == 0$
 print "Roots are equal"

~~"r = " + r₁ + " - " + r₂ + "b / (2 * a)"~~

~~print r~~

Step 8 : Stop

Fluehart

