```java
import java.io.*;
import java.util.*;
import java.lang.Math.*;

/**
 * Class QuadEqtn stands for Quadratic Equation. The class creates a method to
 * calculate the roots of the quadratic equation. integers 'a', 'b', 'c' are the
 * coefficient of the quadratic equation. 'p' and 'q' are the roots of the
 * equation. The math equation to find the roots of quadratic function is broken
 * down as dicriminant, 'x' and 'y'. Discriminant solves for b^2 - 4ac, while
 * 'x' saves the solution for (-b/2a) and 'y' stores the result of the (square
 * root of discriminant/2a).
 *
 */
class QuadEqtn {
    int a, b, c;
    double p, q;
    double x, y;
    double discriminant;

    /*
     * CalculateRoots() solves for the roots of the quadratic function
     */
    void CalculateRoots() {

        discriminant = (b * b) - (4 * a * c);

        x = Math.round((-b / (2.0 * a)) * 100.0) / 100.0;

        if (discriminant > 0) {

            y = ((Math.sqrt(discriminant)) / (2 * a));

            p = Math.round((x + y) * 100.0) / 100.0;

            System.out.println("p = " + p);

```

```
38              q = Math.round((x - y) * 100.0) / 100.0;
39
40              System.out.println("q = " + q);
41
42              System.out.print("\n");
43
44          } else if (discriminant < 0) {
45
46              y = Math.round((((Math.sqrt(Math.abs(discriminant))) / (2 *
  a))) * 100.0) / 100.0;
47
48              System.out.println("p = " + x + " + " + y + "i");
49
50              System.out.println("q = " + x + " - " + y + "i");
51
52              System.out.print("\n");
53
54          } else if (discriminant == 0) {
55
56              y = ((Math.sqrt(discriminant)) / (2 * a));
57
58              p = x + y;
59
60              System.out.println("p = " + p);
61
62              System.out.print("\n");
63          }
64      }
65  }
66
67  public class Question1 {
68
69      /*
70       * main reads the coefficient of the quadratic equation from an input
  text file
71       * which is thrown as exception
72       */
73      public static void main(String[] args) throws Exception {
74
75          System.out.println("Solving Quadric Equations");
76
77          QuadEqtn qE = new QuadEqtn();
```

```
78
79          Scanner x = new Scanner(new File("testQ1.txt"));
80
81          while (x.hasNext()) {
82              qE.a = x.nextInt();
83              qE.b = x.nextInt();
84              qE.c = x.nextInt();
85
86              System.out.println("Value of a: " + qE.a);
87
88              System.out.println("Value of b: " + qE.b);
89
90              System.out.println("Value of  c: " + qE.c);
91
92              System.out.println("Roots of quadratic equation " + qE.a +
   "x\u00B2 + " + qE.b + "x + " + qE.c + ": ");
93
94              qE.CalculateRoots();
95
96              System.out.print("\n");
97          }
98      }
99  }
```