Lab 3: Math Using If

Create a program that gives the user the option of performing one of several math problems. Start out by printing a menu, and receiving the user’s choice. Option 1 indicates the even/odd problem. Option 2 means the quadrant problem. And option 3 means the quadratic equation problem. On any other number, the program should apologize and exit without an arcane error message.

- **Even/odd**: Get an integer from the user. State whether this number is even or odd.
- **Quadrant**: Get two decimal numbers from the user, representing \( x \) and \( y \) coordinates. Output which quadrant this point is located in, according to the diagram shown here.

\[
\begin{array}{c|c}
\text{II} & \text{I} \\
\hline
\text{III} & \text{IV}
\end{array}
\]

If either \( x \) or \( y \) is 0, the point is not any any quadrant. You must print out if the point is on the x-axis (when \( y = 0 \)), on the y-axis (when \( x = 0 \)), or on the origin (\( x = y = 0 \)).

- **Quadratic**: Get three decimal numbers from the user, which we will call \( a \), \( b \), and \( c \). Solve for \( x \) in the quadratic equation \( ax^2 + bx + c = 0 \). This can be done with the formula:

\[
x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}
\]

Usually, there will be 2 valid answers for \( x \); you must state them both. However, when \((b^2 - 4ac)\) is 0, there is only one correct answer. You must state it only once, not twice. And if \((b^2 - 4ac)\) is negative, there is no real solution. Inform the user of the problem, and exit without trying to solve it.

Here’s an example of how it might look:

```
1. Even/Odd Detector
2. Quadrant Finder
3. Quadratic Solver
What is your selection: 3

Quadratic Solver
Please enter a value for a: 2
For b: 7
And for c: -4
The quadratic polynomial 2x^2 + 7x + -4 has two real roots: -4 and 0.5.
```

The name of your class will be **IfMath**.