Three possibilities for a quadratic equation NAME:

This worksheet investigates an example of each of the three possibilities for a quadratic equation. For any quadratic equation, there could be zero, one, or two real solutions. In the case where there are zero real solutions, there will always be two complex solutions. We will use our calculator program to investigate the three equations below and their corresponding functions.

Solve each equation using your QUADRATC (or QUAD2) program. Answer the questions.

1. Solve $0 = x^2 + 4x + 4$ using your program.

a.) What's the solution to $0 = x^2 + 4x + 4$?

b.) Draw the graph of $y = x^2 + 4x + 4$ that your program provided. Notice it should have just one x-intercept. Label it on your graph. This is the solution to the equation.

c.) The quadratic formula is $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$. Find the solutions to $0 = x^2 + 4x + 4$ by figuring the quadratic formula by hand to verify the program's solutions.

d.) Your calculator also gives the vertex of the parabola. This is sometimes useful. Label the vertex on your graph above.

2. Solve $0 = 3x^2 + 2x + 2$ using your program.

a.) What's the solution to $0 = 3x^2 + 2x + 2$?

b.) Draw the graph of $y = 3x^2 + 2x + 2$ that your program provided. Notice it should have no x-intercepts. This means that there are no real numbers that make the equation true. We must use complex numbers to make the equation true. These are the numbers you recorded in part a.

c.) The quadratic formula is $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$. Find the solutions to $0 = 3x^2 + 2x + 2$ by figuring the quadratic formula by hand to verify the program's solutions.

d.) Your calculator also gives the vertex of the parabola. This is sometimes useful. Label the vertex on your graph above.

3. Solve $0 = x^2 + 4x + 2$ using your program.

a.) What's the solution to $0 = x^2 + 4x + 2$?

b.) Draw the graph of $y = x^2 + 4x + 2$ that your program provided. Notice it should have two x-intercepts. Label them on your graph. These are the solutions to the equation.

c.) The quadratic formula is $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$. Find the solutions to $0 = x^2 + 4x + 2$ by figuring the quadratic formula by hand to verify the program's solutions.

d.) Your calculator also gives the vertex of the parabola. This is sometimes useful. Label the vertex on your graph above.