In this exploration, you will discover the relationship between the factors for a quadratic expression and the graph of the quadratic function.

1. Factor the following expression: $x^2 + x - 2$

3. Explain how the factors from the expression above compare to the original polynomial.

3. Go to desmos and graph the following function/equation: $y = x^2 + x - 2$
    A. On the left part of the screen, type in the expression $y = x^2 + x - 2$
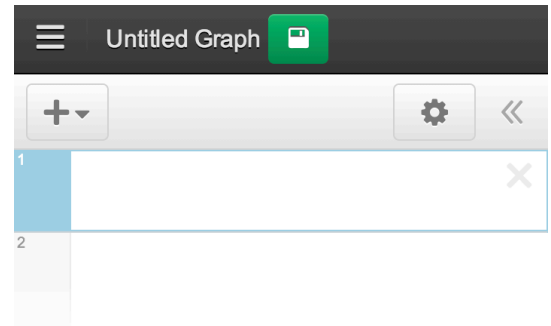
    B. Click on the plus sign and enter the two binomial factors you found when factoring $y = x^2 + x - 2$

    $$y = (\quad\quad)(\quad\quad)$$

Compare the 2 graphs and where the graphs intersect the x-axis. How do the factors for the polynomial compare with where the graph crosses the x-axis?

4. Does your hypothesis hold true for all values for that you replace in your binomial factors?

$$y = (x - a)(x - b)$$

$$a = 1$$

-10   10

$$b = 1$$

-10   10

    A.   Delete your previous expressions and enter the following expression illustrated to the right:

    B. When asked if you would like to make a, b or all sliders choose all.

    C. Click on the points for "a" and "b" and slide the values. How do the values for "a" and "b" compare with the points where the graph crossed the x-axis?

5. What would the values for "a" and "b" have to be in order to have the graph only touch the x-axis in only one place along the axis?

6. What type of polynomial would be created if the 2 factors were multiplied together

Zeros of a Function:

Zero Product Rule: {used when solving quadratic/polynomial equations}

Algebra 1 Lab: Quadratic Equations and Corresponding Graphs