Title: *"Quadratic Formula"*

Students will review how to use the Quadratic Formula to determine the roots (zeroes OR x-intercepts) of an equation, then graph the function using the roots and y-intercept.

Student Objectives

Students will practice using the Quadratic Formula to determine the factored form of the equation, and therefore graph the function using the x-intercepts (zeroes of the function).

Teacher Technology Skills Needed

- In a SMART Notebook file, teachers need to use ink tools to model using the Quadratic Formula.
- If needed, they should use the Write Equation Tool (Math Ink) to convert their ink objects into text.
- Finally, teachers should be familiar with the SLS Online platform for connecting to students and assign handout pages for student practice.

Materials

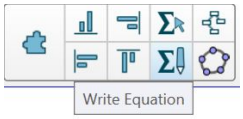
SMART Notebook Lesson "Quadratic Formula" from our ERC Lesson library, found here: https://otis.teq.com/erc/item/247.
SMART Learning Suite Online: http://suite.smarttech.com with teacher login.
Desmos Online Calculator site: http://desmos.com/calculator

Standards

- **AI-A.APR.3 Algebra Arithmetic with Polynomials and Rational Expressions**
  - Understand the relationship between zeros and factors of polynomials.
    - 3. Identify zeros of polynomial functions when suitable factorizations are available.
- **AI-A.REI.3 and 4 Algebra Reasoning with Equations and Inequalities**
  - Solve equations and inequalities in one variable.
    - 3. Solve linear equations and inequalities in one variable
    - 4. Solve quadratic equations in one variable, using the quadratic formula
- **AI-F.IF.7 Functions Interpreting Functions**
  - Graph functions and show key features of the graph by hand and by using technology where appropriate.

Procedure

1. Start with Notebook Lesson page 1, the title page. Use the Math Ink Tool (Write Equation icon) to write out the standard form of a quadratic equation. This will be moved into the box in the upper left corner.



2. Then the teacher/student will move the **a**, **b** and **c** letters underneath the equation to identify what they need to know for the formula.
3. Jump to the SLS Online classroom http://suite.smarttech.com , present the "Quadratic Equation" lesson and show the first example worked out with the ink tools.
4. Go to page 2 and demonstrate how to take the X values from page one as well as the y-intercept value and sketch out the parabola graph.
5. Share the connection link (http://hellosmart.com , Class ID) with students and have them work on the following:
    a. Use the ink tool on page 3 to work out the quadratic formula for the example
    b. Go to page 4 and use the X values from page 3 (also the y-intercept value) to graph a sketch of the parabola.
    c. Do the same for pages 5 and 6; pages 7 and 8

Extension Activities

With a live connection including students on SLSO, the teacher can ask students to work out problems using the ink tools. To show this live, the teacher can make this page a collaborative activity so the rest of the class can see the inking done live.

As a follow up, the teacher can share the Desmos link http://desmos.com/calculator with students and have them enter a quadratic function, first in standard form and then in factored form to prove their quadratic formula work is accurate. Both function graphs should be the same.

Another idea is to have a live (Office Hours) meeting with students, and allow students to share their screen while showing in SLSO how to work the problems. This can be done in a Google Meet where the teacher is screen sharing a Notebook file and the students can run through the Response Quiz live during this time. Since they are in a live meeting, allow students to unmute their microphones and ask questions or explain their thinking.