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| **Stage 1 – Desired Results** |

**Established Goals (Include ACOS standards in this section)**:

* **A1.17** Solve quadratic equations in one variable. [A-REI4]
  1. Use the method of completing the square to transform any quadratic equation in x into an equation of the form (x – p)2 = q that has the same solutions. Derive the quadratic formula from this form. [A-REI4a]
  2. Solve quadratic equations by inspection, taking square roots, completing the square and the quadratic formula, and factoring as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions, and write them as a bi for real numbers a and b.[A-REI4b]
* **A1.15** Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method. [A-REI1]

**Understandings (Students will understand that …)**:

* The quadratic formula is x = and can be derived from ax2 + bx + c = 0
* The discriminant of the quadratic equation ax2 + bx + c = 0 is b2 – 4ac.

**Essential Knowledge (Students will know …)**:

* The Quadratic Formula
* Discriminant

**Essential Skills (Students will be able to …)**:

* Derive the quadratic formula
* Solve a quadratic equation using the Quadratic Formula.
* Determine the number of solutions of a quadratic equation by using the discriminant.

**Essential Question(s)**:

* How can we derive the quadratic formula?
  + By using the quadratic equation, ax2 + bx + c = 0, and using completing the square and square root skills.

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| **Stage 2 – Assessment Evidence** |

**Performance Task(s)**:

* None

**Other Evidence**:

* Poll Activity: Students will use their devices to scan a barcode, which will pull up a problem on their device. The students will have five problems to scan and solve. Once the students are finished solving the problems, the teacher will pull up the poll now website. The website will have each of the problems the students were supposed to solve, with answer choices. The students will text in their answer to the poll now website. Student answers will be shown on the website as they are texted in.

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| **Stage 3 – Learning Plan** |

**Materials needed for the lesson**:

(Other than pencil/pen, all materials will be provided for the students by the teacher.)

* Pencil/pen
* Paper
* Elmo
* PowerPoint
* Internet

**Bell ringer (if one is used)**:

* The students will answer six questions in which they will be evaluating a given expression for x = –2, y = 3, and z = –1. The expressions will include: x2, xyz, x2 – yz, y – xz, –x, and z2 – xy. (5 min)

**Review of relevant, previously learned information**:

* The review of relevant material will be covered in the bell ringer. The students should already know how to evaluate an expression given values for variables. Knowing how to evaluate an expression will prepare the students for the lesson.

**Introductory Activity**:

* The students will be probed with questions on how they can derive ax2 + bx + c = 0 for x. Once the students have talked through the steps as a class, they will have derived the quadratic formula. The teacher will tell the students that they will be using this formula for the lesson. (5 min)

**Body of the lesson**:

* Lecture over the quadratic formula. The teacher will explain that the quadratic formula can be used to solve a quadratic equation. The teacher will explain that this is an additional method to the prior two methods they have learned for solving quadratic equations. (15 min)
  + Students will be given multiple example problems that involve the quadratic formula and discriminant. The teacher will solve an example with the class before having students try an example on their own. The teacher will pose questions throughout the lesson to ensure the students understand why they are solving quadratic equations.
  + No accommodations are needed for students. (No SPE, ESL, gifted students in the class.)
  + The lesson will incorporate multiple methods for the different learners. There will be PowerPoint, video, hands on problem solving, and device usage within the lesson.
* Poll Activity: The students will scan bar codes, which will bring up problems to solve. The students will solve the problems and text their answers into a poll now website. (20-25 min)

**Preview of the next lesson**:

* The teacher will tell the students that in the next lesson they will be learning how to solve a system of equations involving quadratic and linear equations.

**Related out of class assignment**:

* Homework problems

**Other class announcements or information**:

* None