Quadratic Equations Lesson Plan

Title: Introduction into Quadratic Formula

Objective: Students will be able to derive and apply the quadratic formula to various quadratic equations. Students will also be able to interpret when is the best situation to use the quadratic formula or another process to solve a quadratic equation.

Materials: Teacher: dry erase board/markers or overhead/markers
Examples to present to students (can get from text)
Student: Paper and Pencil (Supplied by student)
Textbook (Supplied by school)

Introduction (Engage and Explore): Give students three quadratics to solve: one that could be solved by taking a square root (just have $x^2$), one that could be solved by factoring, and one that could be solved by using completing the square (no leading coefficient and middle term coefficient even). Students can work on this as a warm-up. Discuss why each problem is best solved with the given method. Then give students a quadratic that needs to be solved using completing the square, but is not “as nice” as the first. (For example, $y = 2x^2 + 3x - 4$). Discuss why this problem is as nice using completing the square.

Procedures: Discuss the problems above. Then start deriving the quadratic formula, starting with the standard form of a quadratic equation and using completing the square to derive the quadratic formula. Finally, show how to use the formula to solve any quadratic.

Adaptations: I have shown the derivation for the quadratic formula for both regular and PreAP classes. In PreAP, I have required that they know how to derive the formula. For regular, they need to know the final formula. Feel free to do as wish based on the skill level of your students.

Discussion Questions: Discuss when it may be useful to use the various methods to solve different quadratics. Sometimes one method is faster than the other (i.e. factoring is often faster than using the quadratic formula if you can factor a quadratic).

Assessment/Evaluation: Students will be given homework problems out of the book to work on. Later these problems will be quizzed and tested over.

Extensions: Students can try to solve quadratic problems using more than one method. Students can also start looking at comparing the solutions using the quadratic formula and how that is represented on the graph. (I usually discuss the discriminant on a second day of using the quadratic formula.)

Suggested Reading: Read section in the textbook. Also look for various websites and other resources over quadratic equations.

Animation of the derivation: http://www.csm.astate.edu/algebra/qform.html

Vocabulary: Quadratic, Factoring, Square Root, Completing the Square

Academic Standards: Algebra 2 TEKS:

d) Quadratic and square root functions: knowledge and skills and performance descriptions.

(1) The student understands that quadratic functions can be represented in different ways and translates among their various representations. Following are performance descriptions.

(A) For given contexts, the student determines the reasonable domain and range values of quadratic functions, as well as interprets and determines the reasonableness of solutions to quadratic equations and inequalities.

(3) The student formulates equations and inequalities based on quadratic functions, uses a variety of methods to solve them, and analyzes the solutions in terms of the situation. Following are performance descriptions.

(B) The student analyzes and interprets the solutions of quadratic equations using discriminants and solves quadratic equations using the quadratic formula.

(D) The student solves quadratic equations and inequalities.

Time of Lesson: Lessons are for 50 minute periods.