

## Guided Practice: Quadratic Formula (based on Talbert, pp 114 – 122)

**OVERVIEW:** Solving quadratic equations in standard form

$$ax^2 + bx + c = 0$$

where  $a$ ,  $b$ , and  $c$  are constants with  $a \neq 0$  can be achieved sometimes by factoring, but often we need to employ the *quadratic formula*. These equations arise out of finding the roots (= intersections of the graph with the horizontal axis) of a quadratic function  $f(x) = ax^2 + bx + c$ . These functions are used for example to model the position of an object which is released and then moves under the influence of gravity only. In this lesson, we'll learn about the quadratic formula, how to use it to solve a quadratic equation and some real-world applications, and think about how we can use the quadratic formula to predict how many solutions the quadratic equation has.

### LEARNING OBJECTIVES

**Basic objectives** (to be practiced *prior* to class):

- State the quadratic formula.
- Use the quadratic formula to find the roots of a second-degree polynomial.

**Advanced objectives** (to be mastered *during and after* class):

- State the conditions under which a second-degree polynomial will have two real roots, one repeated (real) root, or two complex roots.
- Apply the quadratic formula to solve a real-world problem.

### RESOURCES FOR LEARNING

The following are default suggestions for learning the material in this lesson. You may use these plus any other additional materials you can find.

- **Text:** Read the section on “The quadratic formula” in your textbook (pages  $x - y$ ).
- **Video:** Watch the following videos (total time 8:21 to 18:52)
  - [Using the quadratic formula to solve for the roots of a 2<sup>nd</sup> degree polynomial](#) (Watch at least the first 6 minutes; for additional examples, you can watch the whole video; total running time = 16 minutes, 31 secs)
  - [Solving a quadratic equation that is not in standard form](#) (2:21)
- **Computer simulation:** Play with the manipulative on this website to see the effect that changing the constants has on the number of solutions (roots):  
<http://demonstrations.wolfram.com/QuadraticEquation/>

**EXERCISES:** The exercises for this lesson are found on the Google Form at: [Quiz Quadratic Formula](#). Work out these exercises in your own notes so you'll have a record of your work and then take the quiz. Remember your work is graded Pass/Fail on the basis of completeness, effort, and timeliness only.

**SUBMISSION INSTRUCTIONS:** Once you submit the Google Form, your work is submitted. You should see the correct answers once you have submitted. Submissions are due at midnight the day before class. If you do not have access to the Internet where you live, please let me know in advance and we will make alternate arrangements.