## Lesson 17: Completing the Square and Complex Solutions

* Let’s find complex solutions to quadratic equations by completing the square.

### 17.1: Creating Quadratic Equations

Match each equation in standard form to its factored form and its solutions.

* ,
* 5, -5
* , ​​​​

### 17.2: Sometimes the Solutions Aren't Real Numbers

What are the solutions to these equations?

### 17.3: Finding Complex Solutions

Solve these equations by completing the square.

#### Are you ready for more?

For which values of does the equation have two real solutions? One real solution? No real solutions? Explain your reasoning.

### 17.4: Can You See the Solutions on a Graph?

1. How many real solutions does each equation have? How many non-real solutions?
2. How do the graphs of these functions help us answer the previous question?

### Lesson 17 Summary

Sometimes quadratic equations have real solutions, and sometimes they do not. Here is a quadratic equation with equal to a negative number (assume is positive):

This equation will have imaginary solutions and . By similar reasoning, an equation of the form:

will have non-real solutions if  is positive. In this case, the solutions are  and .

It isn’t always clear just by looking at a quadratic equation whether the solutions will be real or not. For example, look at this quadratic equation:

We can always complete the square to find out what the solutions will be:

This equation has non-real, complex solutions and .



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