Algebra 1  
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Unit 8, Lesson 14

# Completing the Square (Part 3)

* Let’s complete the square for some more complicated expressions.

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## 14.1Perfect Squares in Two Forms

Previously, we saw that  can be expanded to standard form as .

1. Expand  into standard form.
2. Be prepared to share a conjecture about the relationship between the coefficients 5 and 3 in the factored form and the values in standard form.

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## 14.2Perfect in a Different Way

1. Write each expression in standard form:
2. Decide if each expression is a perfect square. If so, write an equivalent expression of the form . If not, suggest one change to turn it into a perfect square.

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## 14.3When All the Stars Align

1. Find the value of to make each expression in the left column a perfect square in standard form. Then, write an equivalent expression in the form of squared factor. In the last row, write your own pair of equivalent expressions.

| * standard form | * squared factor |
| --- | --- |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |

1. Solve each equation by completing the square:

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## 14.4Putting Stars into Alignment

Here are three methods for solving .

Try to make sense of each method.

Method 1:

Method 2:

Method 3:

Once you understand the methods, use each method at least one time to solve these equations.

### Are you ready for more?

Find the solutions to . Explain your reasoning.

## Lesson 14 Summary

In earlier lessons, we worked with perfect squares such as and . We learned that their equivalent expressions in standard form follow a predictable pattern:

* In general, can be written as .
* If a quadratic expression of the form is a perfect square, and the value of is 1, then the value of is , and the value of is for some value of .

In this lesson, the variables in the factors being squared had coefficients other than 1, for example and . Their equivalent expressions in standard form also followed the same pattern we saw earlier.

| squared factor | standard form |
| --- | --- |
|  |  |
|  |  |

In general, can be written as:

or

If a quadratic expression is of the form , then:

* The value of is .
* The value of is .
* The value of is .

We can use this pattern to help us complete the square and solve equations when the squared term has a coefficient other than 1—for example, .

What constant term can we add to make the expression on the left of the equal sign a perfect square? And how do we write this expression as a squared factor?

* , which is , so , and the squared factor could be .
* 40 is equal to , so , or . This means that .
* If is , then , or .
* So the expression is a perfect square and is equivalent to .

Let’s solve the equation by completing the square!

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