



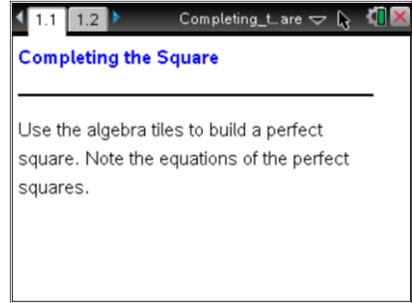
# Completing the Square

## Student Activity

Name \_\_\_\_\_  
Class \_\_\_\_\_

Open the TI-Nspire document *Completing\_the\_Square.tns*.

This activity lets you build perfect square quadratics with lead coefficient 1 using algebra tiles. This geometric model will be used to verify the algebraic expression.



Move to page 1.2.

Press **ctrl** **▶** and **ctrl** **◀** to navigate through the lesson.

1. Build perfect square quadratics with lead coefficient 1 by dragging the algebra tiles to the middle window. Record the perfect squares found. Type **reset( )** to start over to find a new perfect square.

Side of Square	Perfect Square Quadratic	Coefficient of $x$ -term	Constant Term

2. What patterns do you notice for all perfect squares?
  - a. What relationship exists between the side of the square and the coefficient of the  $x$ -term?
  - b. What relationship exists between the side of the square and the constant term?
  - c. What relationship exists between the coefficient of the  $x$ -term and the constant term?
  - d. Why is this called “completing the square”?



3. Expand the following:

a.  $(x)(x)$

b.  $(x + 1)(x + 1)$

c.  $(x + 2)(x + 2)$

d.  $(x + 3)(x + 3)$

e.  $(x + n)(x + n)$

4. Use either method to find  $(x + 5)^2$ .

5. State whether the following are perfect square quadratics. Explain why or why not.

a.  $x^2 + 3x + 9$

b.  $x^2 + 14x + 49$

c.  $x^2 + 24x + 144$

d.  $x^2 + 6x + 36$



6. Fill in the missing terms to make the following perfect square quadratics.

a.  $x^2 + 16x + \underline{\hspace{2cm}}$

b.  $x^2 + \underline{\hspace{2cm}} + 81$

c.  $x^2 + 22x + \underline{\hspace{2cm}}$

d.  $x^2 + \underline{\hspace{2cm}} + 100$

e.  $x^2 + 3x + \underline{\hspace{2cm}}$

7. In your own words, explain how to “complete the square” algebraically.

8. Expand the following:

a.  $(x)(x)$

b.  $(x - 1)(x - 1)$

c.  $(x - 2)(x - 2)$

d.  $(x - 3)(x - 3)$



e.  $(x - n)(x - n)$

9. Do the negative values in question 8 change the pattern of perfect square quadratics? Explain.

10. Fill in the missing terms to make the following perfect square quadratics.

a.  $x^2 - \underline{\hspace{2cm}} + 289$

b.  $x^2 - 26x + \underline{\hspace{2cm}}$

c.  $x^2 - 36x + \underline{\hspace{2cm}}$

d.  $x^2 - \underline{\hspace{2cm}} + 225$

e.  $x^2 - 5x + \underline{\hspace{2cm}}$