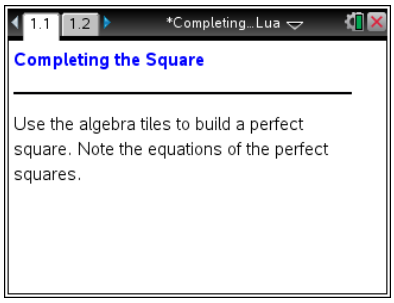
Completing the Square
Student Activity

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. Click **(R)eset** 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. $x^2 + 16x +$ _____

   b. $x^2 +$ _____ $+ 81$

   c. $x^2 + 22x +$ _____

   d. $x^2 +$ _____ $+ 100$

   e. $x^2 + 3x +$ _____

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. $x^2 - \_\_\_\_\_ + 289$

b. $x^2 - 26x + \_\_\_\_\_$

c. $x^2 - 36x + \_\_\_\_\_$

d. $x^2 - \_\_\_\_\_ + 225$

e. $x^2 - 5x + \_\_\_\_\_$