Name: _____ Date: _____ Period: _____

Secondary II Completing the Square with Algebra Tiles

1. Use algebra tiles to model the expression $x^2 + 6x + 9$ and draw it below.

2. $x^2 + 6x + 9$ is a **perfect square trinomial**. Why do you think it is called a perfect square trinomial?

3. We will now use algebra tiles to create **perfect square trinomials**.
    a. Create a partial square with algebra tiles to represent $x^2 + 2x +$ ____. Draw it below.

    b. How many unit tiles do you need to complete the square? Complete the expression above to show how many unit tiles it took to create a square.

    c. What are the dimensions or factors of the completed square? Write this in factored form and as a square.

    d. Why do you think the process we just did is called **completing the square**?

4. Use algebra tiles to find the value of *c* that completes the square for each of the following expressions and complete the table below:

Expression	Number of tiles needed to complete the square	Perfect Square Trinomial (expression with value plugged in for *c*)	Perfect Square Binomial (dimensions or factored form)
$x^2 + 4x + c$			
$x^2 + 6x + c$			
$x^2 + 8x + c$			
$x^2 + 10x + c$			

5. How does the number of tiles needed to complete the square relate to the coefficient of your linear term (term with *x*)? Tie this relationship back to the process you used to build and complete the square with the tiles.

6. Generalize this process to tell how for any quadratic expression in standard form $ax^2 + bx + c$ you can use the value of *b* to determine the value of *c* that will complete the square.

7. Use this process to find the value of *c* that **completes the square** for the following expressions without using the tiles. Write your answer in factored form.
   a. $x^2 + 12x + c$

   b. $x^2 - 6x + c$

   c. $x^2 + 3x + c$

8. What is the relationship between the coefficient of your linear term (term with *x*) and the constant in the perfect square binomial (factored form)? Tie this back to the process you used to build and complete the square with the tiles.

9. Generalize this process to tell how for any perfect square trinomial in standard form $ax^2 + bx + c$ you can use the value of *b* to find the value of *d* in the factored form of the expression $(x + d)^2$.

10. Use this process to write each of the following expressions as perfect square binomials (factored form).
    a. $x^2 + 14x + 49$

    b. $x^2 + 5x + \frac{25}{4}$

    c. $x^2 - 8x + 16$

Practice

Directions: Find the value of *c* that completes the square. Write your answer as a perfect square binomial (factored form). The first one has been done for you.

Expression	Perfect Square Trinomial	Perfect Square Binomial (factored form)
11. $x^2 + 16x + c$	$x^2 + 16x + 64$	$(x + 8)^2$
12. $x^2 + 18x + c$		
13. $x^2 - 8x + c$		
14. $x^2 + 7x + c$		
15. $x^2 - 3x + c$		
16. $x^2 - 4x + c$		
17. $x^2 - 12x + c$		
18. $x^2 + bx + c$		