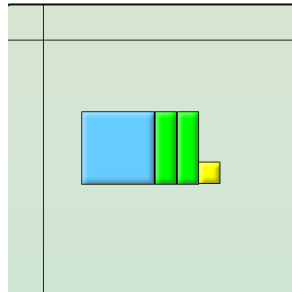


Factoring Trinomials using Algebra Tiles

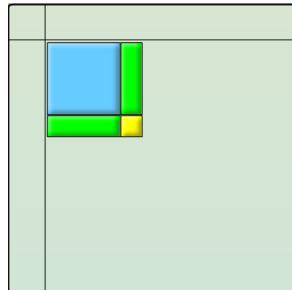
Algebra tiles can be used as a model for factoring trinomials. When you multiply two binomials, your result is a trinomial. We used area models to multiply binomials. Therefore, to be able to factor a trinomial using algebra tiles, you must first rearrange the tiles into the shape of a rectangle.

1. Factor the expression $x^2 + 2x + 1$.

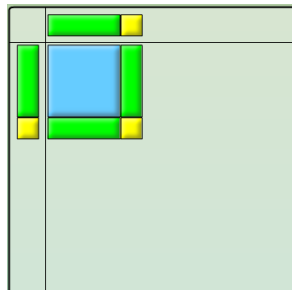
a. This trinomial is made up of one x^2 tile, two x tiles, and one unit tile.



b. Arrange these tiles to form a rectangle.



c. Use algebra tiles to identify the width and length of the rectangle.

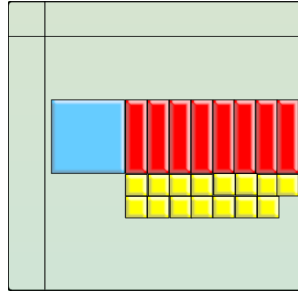


d. The width has one x tile and one unit tile. The length has one x tile and one unit tile. Therefore, the factors of $x^2 + 2x + 1$ are $(x+1)$ and $(x+1)$. This means that:

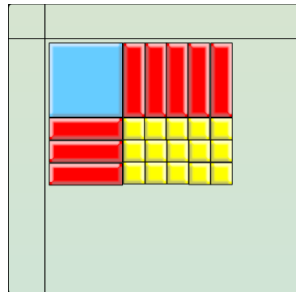
$$x^2 + 2x + 1 = (x+1)^2$$

2. Factor the expression $x^2 - 8x + 15$.

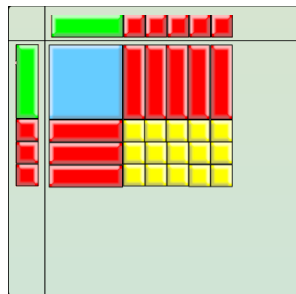
a. This trinomial is made up of one x^2 tile, eight x tiles, and fifteen unit tiles.



b. Arrange these tiles to form a rectangle. The key is to correctly arrange the unit tiles to match the number of x tiles.



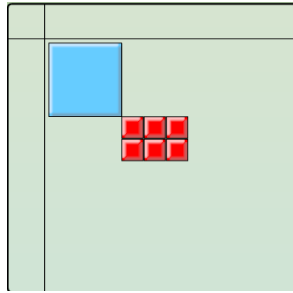
c. Use algebra tiles to identify the width and length of the rectangle.



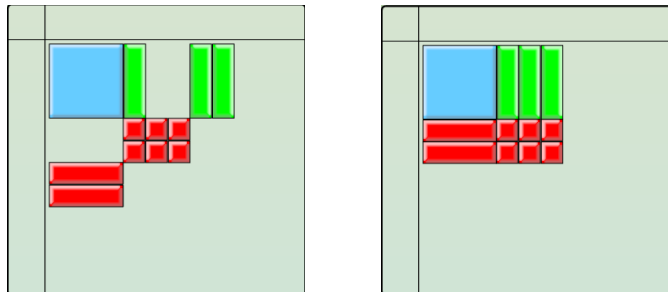
d. Write an equation to show the meaning of the model for this problem.

3. Special care must be taken when the c value in $ax^2 + bx + c$ is negative. Let's begin by factoring $x^2 + x - 6$.

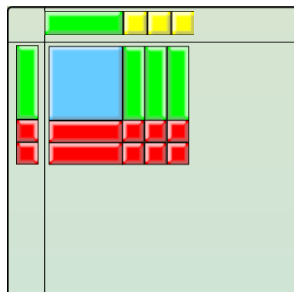
- a. This trinomial is made up of one x^2 tile, one x tile, and six negative unit tiles. It may be helpful to begin with the x^2 tile and six negative unit tiles. Arrange these tiles to form a rectangle. (Note: There may be multiple ways to arrange the unit tiles so some trial and error may be necessary).



- b. Since there are negative unit tiles, this means we will have to introduce some negative x tiles to create the rectangle. Just keep in mind – for every negative x tile you introduce, you must introduce a positive x tile. Otherwise, you are changing the value of the expression.

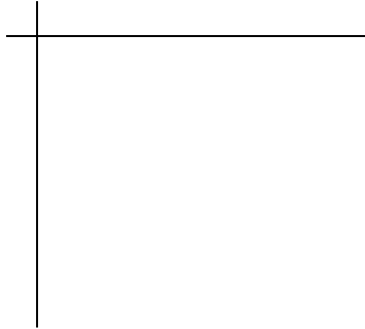


- c. Identify the width and length of the rectangle and then write an equation to represent the model.

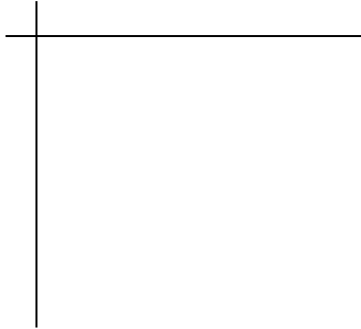


Practice: Factor each expression using algebra tiles.

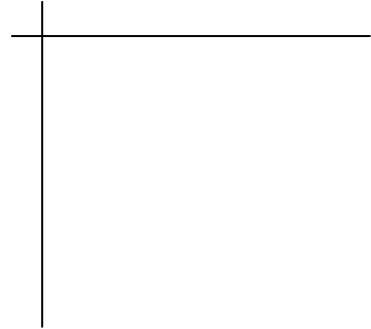
1. $x^2 + 5x + 6$



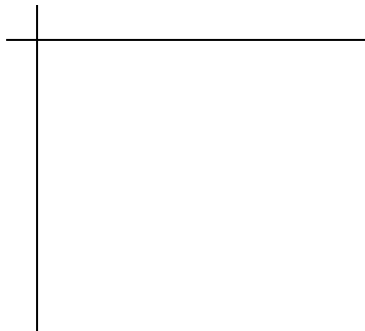
2. $x^2 - 5x + 4$



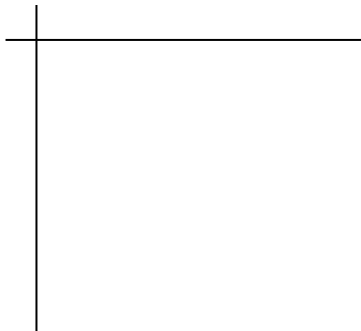
3. $x^2 - 4x - 12$



4. $x^2 + 7x - 8$



5. $2x^2 + 7x + 6$



6. $2x^2 + 5x - 12$

