**The Geometry of Algebra (Multiplication)**

Take an algebra tile kit and examine what is in it. Play around with it for a few minutes and let’s make a list of any relationships among the shapes in the kit.

Show 3x(x + 1) with Algebra Tiles. Draw the algebra tile picture and write down the symbolic result.

Show (2x + 2)(x + 5) with Algebra Tiles. Draw the algebra tile picture and write down the symbolic result.

Continue by showing 2 more distributive properties and 2 more double distributions of your own. Does this work if values are negative? E.g. 3x(x - 1) or (2x - 2)(x - 5)

**Completing the Square: Algebra Tiles**

Use Algebra Tiles to represent the following quadratic quantities geometrically then use that representation to factor the quadratic. **Draw the picture of each.**

1. 
2. 
3. 

Describe anything you notice about the factored terms and their connections to the original quadratic expressions.

Use Algebra Tiles to determine what value is needed to complete the square. Make the appropriate algebra tile drawing to accompany your solution.

1. 
2. 
3. 
4. 

**Completing the Square: Coefficient “a”??**

It is clear that students will need more types of example d) to perhaps make a stronger connection. Use the fraction tiles to “makes sense of” and “reason out” what must be done to find the missing number in cases other cases like d) where coefficient “a” is a perfect square.

Take the space below to create similar questions like d), draw the algebra tile pictures. ***For now, choose examples that work out nicely with the Algebra Tiles***. Please feel free to combine multiple algebra tile kits. Create the examples with the following questions in mind:

1. What effect does having multiple  do to the way the’s are split up?
2. Does that have any connection to the number that ends up being needed to complete the square?

Demonstrate geometrically and algebraically, if given problems of the typewhere “*a*” is a perfect square, then how can we use just the coefficients “a” and “b” to find the constant needed to complete the square?

**Completing the Square: But what if it’s ugly?**

**What is required to complete the square? Can we use our drawing to find and think through what must be done to force it to be a square??**

1. 
2. 
3. 
4. 

**Completing the Square (Vertex Form):**

**Recall that vertex form is **

**Use completing the square on to find the vertex (h, k) in terms of coefficients a, b, c. You must write a thorough justification for each algebraic step.**

**Completing the Square: Derive the Quadratic Formula**

**Use the “completing the square” technique to solve for x when  to reveal the quadratic formula. You must write a thorough justification for each algebraic step.**