**Algebra 2 Section 5.4 Investigation – Completing the Square**

**Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Period\_\_\_\_\_\_\_\_\_\_\_\_\_Date\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Step 1 a. Complete a rectangle diagram to find the product (x + 5)(x + 5), which can be written (x + 5)2 . Write out the four-term polynomial, and then combine any like terms you see and express your answer as a trinomial.**

**b. What binomial expression is being squared, and what is the perfect-square trinomial represented in this rectangle diagram?**

**c. Use a rectangle diagram to show the binomial factors for the perfect-square trinomial .**

**d. Find the perfect-square trinomial equivalent to (a + b)2 = \_\_\_ + \_\_\_ + \_\_\_.**

**Describe how you can find the first, second, and third terms of the perfect-square trinomial (written in general form) when squaring a binomial.**

**Step 2 Consider the expression .**

1. **What could you add to the expression to make it a perfect square? That is, what must you add to complete this diagram?**
2. **If you add a number to an expression, then you must also subtract the same number in order to preserve the value of the original expression. Fill in the blanks to rewrite as the difference between a perfect square and a number.**
3. **Use a graph or table to verify that your expression in the form (x – h)2 + k is equivalent to the original expression, x2 + 6x . What do you notice?**

**Step 3 Identifying the vertex of a parabola.**

1. **Graph (x – 2)2 + 5. What is the coordinate point of the vertex?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
2. **Write a quadratic in vertex form that has a vertex of (- 3, -1).\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
3. **Complete the statement: The vertex is (\_\_\_, \_\_\_) from the equation (x – h)2 + k.**
4. **The tricky part about this is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.**

**Step 4 Let’s get ready to SOLVE by completing the square. Use .**

* **Set quadratic equal to zero.**
* **Leave the A and B term on the left side of the equal sign.**
* **If needed, move the C term to the right side of the equal sign.**
* **Take half of B, square it, and add it to both sides of the equal sign.**
* **Why are we adding to BOTH sides of the equal sign?**
* **Write the trinomial as a binomial squared.**
* **Use the square root to start solving for x.**

**(You should get x = 0 and x = - 6)**

**Step 5 Try these! Identify the vertex of each parabola by completing the square. Check with graph!**

1. **b. c.**

**Step 6 Try these! Solve each quadratic by completing the square. Check with graph!**

1. **b. c.**