Completing the Square Class Work

🕊 **Objective:** *You will be able to solve equations via completing the square.*

✯ Create a perfect square trinomial, in standard form, then identify the values of a, b, and c.

     Ex.   *a =   , b =   , c =*

Compare with at least three of your peers, and see if you can determine the relationship between b and c in your trinomials! ☺

✯ **SOLVING BY COMPLETING THE SQUARE**:

*Example 1: Solve $x^2 - 6x + 33 = 0$

           * left side starts with x^2;
               right side only contains constant

           * add $(b/2)^2$ to both sides

           *factor the perfect square, and solve

*Example 2: Solve $4x^2 + 8x + 5 = 0$

           * left side starts with x^2;
               right side only contains constant

           * add $(b/2)^2$ to both sides

           *factor the perfect square, and solve

✎ Practice: Complete the square to solve each equation.

1. $x^2 - 16x - 4 = 0$

2. $4x^2 + 2x - 15 = 0$

3. $\frac{1}{2}x^2 + x - 3 = 5$

4. $z^2 + 4z + 10 = 2$

5. $-x^2 + 18x - 5 = -13$

6. $w^2 - 12w + 1 = 10$

7. $r^2 + 10r + 10 = 1$ 8. $2x^2 + 2x + 8 = 3$

✯ **Exit Slip:** Complete the square to solve the equation $x^2 - 14x + 10 = 0$

Write any questions you still have for me regarding completing the square. If you do not have any questions, either write something you learned in class today that you had not known before OR create a problem that could be solved using the ideas and concepts we worked with during class today.

Applications of Completing the Square Class Work

✠ **Objective:** *You will be able to identify important aspects of quadratic equations and solve problems via completing the square.*

★ **GUIDED EXAMPLE:**

Identify the vertex (also state if it is a maximum or minimum) and x-intercepts of the quadratic function given by the equation
$$y = 2x^2 + 56x - 9.$$

✎ **Practice:** Identify the vertex (also state if it is a maximum or minimum) and x-intercepts of each quadratic function.

1. $y = x^2 + 10x + 18$

2. $y = -x^2 - 10x + 9$

3. $y = \frac{1}{2}x^2 - 7x - 5$

4. $y = x^2 + 38x - 24$

5. $y = -x^2 - 24x + 17$

6. $y = 2x^2 + 8x - 20$

Real World Problem-Solving

1. Your friend throws a ball straight up, from 2 feet above the ground with an initial velocity in feet per second. The height of the ball can be modeled by the function h = -0.05x^2 + 0.4x + 4, where x is the horizontal distance, in feet, from the point where your friend is standing.

Part A: Determine the vertex of the graph of the function. What does this mean in terms of context?
Part B: Is the height you found in part A a maximum or a minimum height, and how do you know?
Part C: You are three feet away from your friend. How high would you have to reach to catch the ball? Would this occur before or after the vertex?
Part D: Assuming no one catches or interferes with the ball, how far away from your friend would you expect the ball to land?   Explain.

2. Lenka makes and sells crystal jewelry. She determined that her monthly profit is determined by the price she chooses to sell each bracelet for. The function P = -b^2 + 80b – 500 models the monthly profit she makes from selling bracelets at any given price, b.

Part A: What issues could Lenka run into if she charges too high of a price?
Part B: Determine the maximum profit Lenka can expect to make on monthly bracelet sales, as well as the price that she should charge per bracelet in order to do so.

Concept **L**earned:

One **S**pecific **E**xample:

Relevance:

Homework:
      Day 1: p. 281-283 - #7 – 27 odds only
                         - Choose ANY one odd-numbered problem from #41 - 47
                         - # 65 & 69
      Day 2: p. 281-283 - #29 – 39 odds only, 51, 53, and 55
            *TRY a Challenge: choose any one odd-numbered problem from #57-62

Check your answers with the back of the book, and be prepared to ask me any questions you have. ☺