**Algebra 2**, Unit 9: Quadratics **#26**

**Day #26: Multiplying**

Now we’re going to learn about multiplying factors to change the form of a quadratic.

We’re going to use what’s called an **AREA MODEL** to multiply. How do you find the **area of a rectangle?**



**Vocabulary**

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| **Polynomial:** |
| **Binomial:** |

 **Multiplying Perfect Square Binomials**

**Remember the last couple classes we have learned about quadratic equations in this special form called Vertex Form: y = a(x - h)2 + k**. We’re going to explore the “**(x - h)**2” part and see how it can be represented another way.

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| **Example 1:** Let’s say we have a perfect square where each side is (x - 1) units in length. **First...How can I represent the area as a product?****Second,** let’s find the area with an area model: **Third,** write the area as a *simplified* sum:  |

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| **Example 2:** Multiply out (x + 3)2**First,** expand out (x + 3)2 = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**Second**, let’s find the area with an area model: **Third,** write the area as a *simplified* sum:  |

**You Try:**

**Expand out each expression and then use an area model to find the product. Then *simplify* the expression. Notice any patterns.**

**1.** (x + 1)2 = **2.** (x - 2)2 = **3.** (2x + 1)2 =



Simplified: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Simplified: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Simplified: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

4. **Generalize:** What would (a + b)2 simplify to when you multiply it out?

**Rectangles**

5. (3x + 2)(x – 1) 6. (3x – 2)(2x – 1) 7. (4x – 1)(2x + 3)



**For the problems below, draw your own appropriate area model.**

7. 3(x2 + 5x + 7) 8. (x + 5)(x2 +6x - 7)

**Solve real-world problems:**

**1.** You are designing a rectangular skateboard park on a lot that is on the corner of a city block. The park will have a walkway along two sides. The dimensions of the lot and the walkway are shown in the diagram.

**a.** Write a polynomial that represents the area of the skateboard park.

**b.** What is the area of the park if the walkway is 3 feet wide?



**2.** You are planning to build a brick walkway that surrounds a rectangular garden, as shown. The width of the walkway around the garden is the same on every side.

**a.** Write a polynomial that represents the combined area of the garden and the walkway.

**b.**  Find the combined area when the width of the walkway is 4 feet.

**3.** The dimensions of a rectangle are **x + 3** and  **x + 2**. Which expression represents the area of the rectangle?

a) x2 + 6 b) x2 + 5x + 6 c) x2 + 6x + 6 d) x2 + 6x

Explain how you chose your solution to **problem 3.**