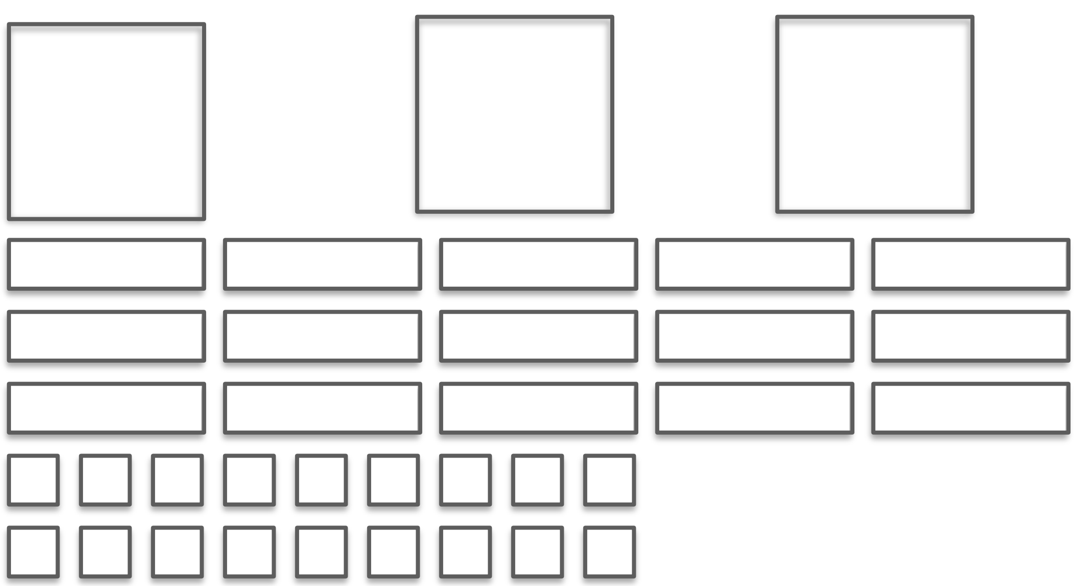
Lesson 7 The Wow Factor

A Solidify Understanding Task

Optima's Quilts sometimes gets orders for blocks that are multiples of a given block. For instance, Optima got an order for a block that was exactly twice as big as the rectangular block that has a side that is 1" longer than the basic size, x, and one side that is 3" longer than the basic size.

1. Draw and label this block. Write two equivalent expressions for the area of the block.

2. Oh dear! This order was scrambled and the pieces are shown here. Put the pieces together to make a rectangular block and write two equivalent expressions for the area of the block.



3. What do you notice when you compare the two equivalent expressions in problems #1 and #2?

4. Optima has a lot of new orders. Use diagrams to help you find equivalent expressions for each of the following:

a. $5x^2 + 10x$

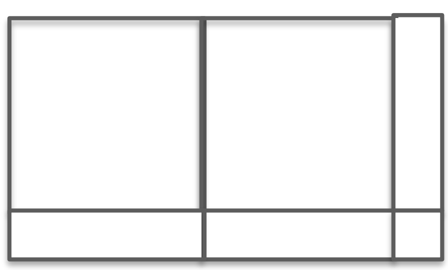
b. $3x^2 + 21x + 36$

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

d. $2x^2 - 10x + 12$

e. $3x^2 - 27$

Because she is a great business manager, Optima offers her customers lots of options. One option is to have rectangles that have side lengths that are more than one x. For instance, Optima made this cool block:



5. Write two equivalent expressions for this block. Use the distributive property to verify that your answer is correct.

6. Here we have some partial orders. We have one of the expressions for the area of the block and we know the length of one of the sides. Use a diagram to find the length of the other side and write a second expression for the area of the block. Verify your two expressions for the area of the block are equivalent using algebra.

a. Area: $2x^2 + 7x + 3$ Side: $(x + 3)$

Equivalent expression for area:

b. Area: $5x^2 + 8x + 3$ Side: $(x + 1)$

Equivalent expression for area:

c. Area: $2x^2 + 7x + 3$ Side: $(2x + 1)$

Equivalent expression for area:

7. What are some patterns you see in the two equivalent expressions for area that might help you to factor?

8. Business is booming! More and more orders are coming in! Use diagrams or number patterns (or both) to write each of the following orders in factored form:

a. $3x^2 + 16x + 5$

b. $2x^2 - 13x + 15$

c. $3x^2 + x - 10$

d. $2x^2 + 9x - 5$

9. In *The x Factor*, you wrote some rules for deciding about the signs inside the factors. Do those rules still work in factoring these types of expressions? Explain your answer.

10. Explain how Optima can tell if the block is a multiple of another block or if one side has a multiple of x in the side length.

11. There's one more twist on the kind of blocks that Optima makes. These are the trickiest of all because they have more than one x in the length of both sides of the rectangle! Here's an example:

Write two equivalent expressions for this block. Use the distributive property to verify that your answer is correct.

12. All right, let's try the tricky ones. They may take a little messing around to get the factored expression to match the given expression. Make sure you check your answers to be sure that you've got them right. Factor each of the following:

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

b. $10x^2 + 17x + 3$

c. $4x^2 - 8x + 3$

d. $4x^2 + 4x - 3$

e. $9x^2 - 9x - 10$

12. Write a "recipe" for how to factor trinomials in the form, $ax^2 + bx + c$.