

MATH 10 - UNIT 5 - LESSON 3 - MULTIPLYING USING ALGEBRA TILES OR AREA MODEL

POLYNOMIALS UNIT

Name: Key Block: _____ Date: 1st

Warm up! Multiply then simplify the following expressions.

$$\begin{aligned}
 1. \quad & (3x^2 - 1)(4x^2 - 2x + 1) \\
 & = 12x^4 - 6x^3 + 3x^2 - 4x^2 + 2x - 1 \\
 & = 12x^4 - 6x^3 - x^2 + 2x - 1
 \end{aligned}$$

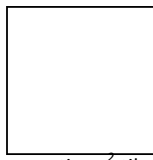
$$\begin{aligned}
 2. \quad & -2(b - 5)^2 \\
 & = -2(b^2 - 10b + 25) \\
 & = -2b^2 + 20b - 50
 \end{aligned}$$

→ square the 1st
- sign of the middle
- 2 · 1st · 2nd
- square the second

Algebra Tiles:



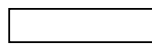
positive x^2 -tile



negative x^2 -tile



positive x -tile



negative x -tile



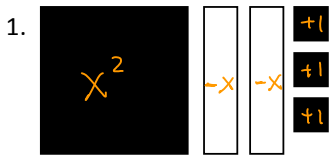
positive 1-tile



negative 1-tile

Before we start multiplying, let's do a quick review of how to use algebra tiles to represent polynomials!

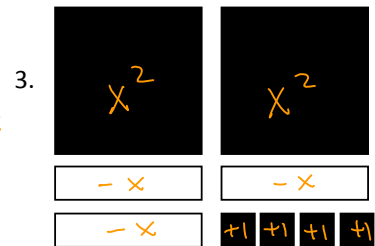
Example: Write a polynomial expression to represent the following diagrams.



$$= x^2 - 2x + 3$$



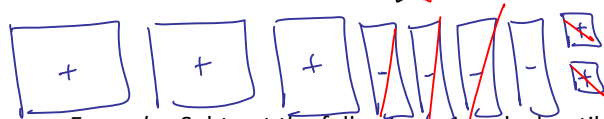
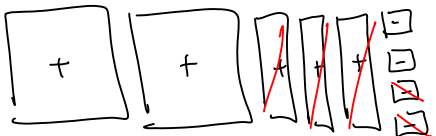
$$= -2x^2 + x$$



$$= 2x^2 - 3x + 4$$

Zero pairs Example: Add the following using algebra tiles and write your answer symbolically.

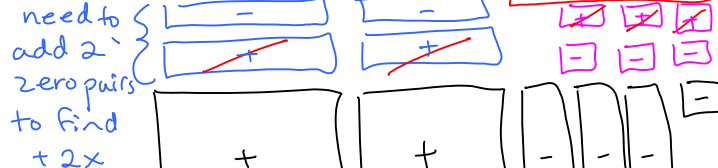
cancel out! 1. $(2x^2 + 3x - 4) + (3x^2 - 4x + 2) = 5x^2 - x - 2$ 2. $(3x^2 - 4x - 3) + (-2x^2 + 2x - 2) = x^2 - 2x - 5$



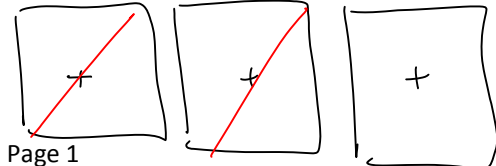
Example: Subtract the following using algebra tiles and write your answer symbolically. (Don't forget you can add zero pairs if you need to!)

1. $(3x^2 + 5x - 4) - (2x^2 + 4x - 2) = x^2 + x - 2$ 2. $(2x^2 - 3x - 1) - (-2x^2 + 2x + 3) = 4x^2 - 5x - 4$

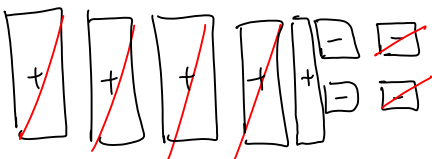
$$= x^2 + x - 2$$



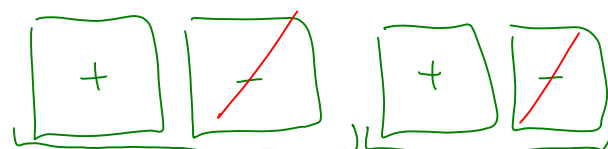
take away 2 +ve x^2 's



take away 4 +ve x 's



← take away 2 -ve 1's



→ need to add in 2 zero pairs to find -2x^2

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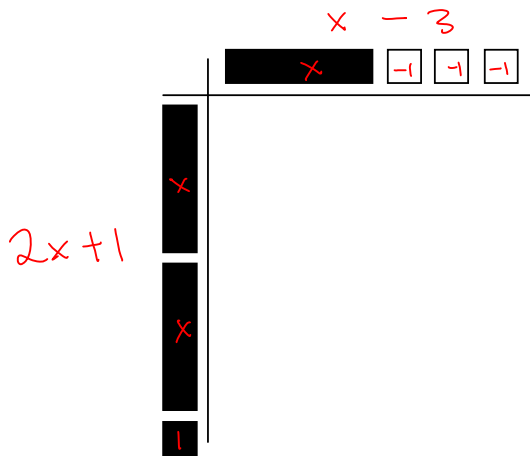
POLYNOMIALS UNIT

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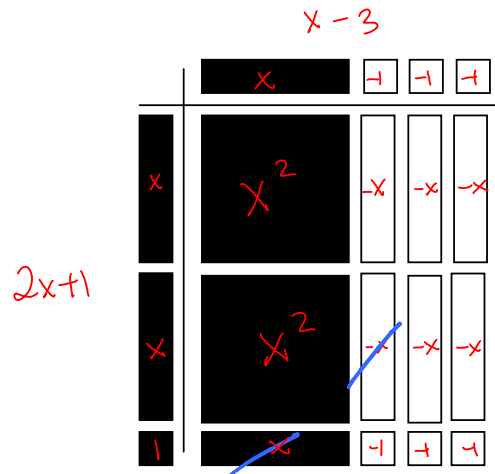
Multiply Binomials using Algebra Tiles

Example: Multiply $(x - 3)(2x + 1)$ using algebra tiles.

Step #1: Use algebra tiles to show the dimensions given in the question $(x - 3)$ and $(2x + 1)$



Step #2: Complete a rectangle that has these dimensions.



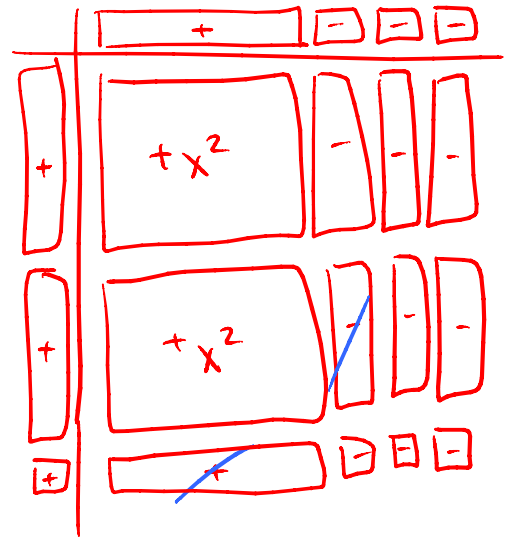
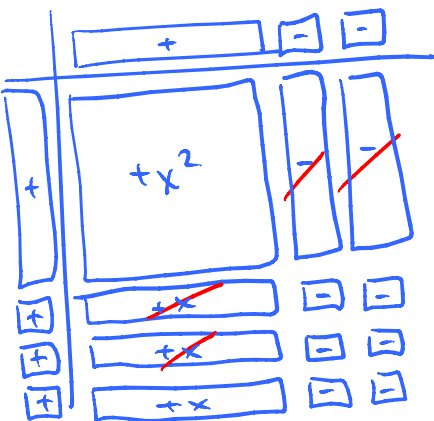
Step #3: Write your answer symbolically!

$$(x-3)(2x+1) = 2x^2 - 5x - 3$$

Try it! Multiply using algebra tiles and sketch your work. Write your answer symbolically.

1. $(x - 2)(x + 3) = x^2 + x - 6$

2. $(x - 3)(2x + 1) = 2x^2 - 5x - 3$



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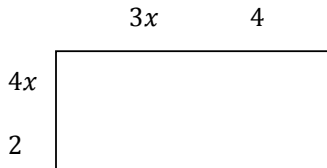
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Multiply Binomials using an Area Model

Example: Expand $(3x + 4)(4x + 2)$ using an area model. Write your answer symbolically.

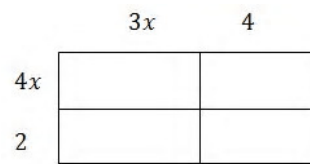
Step #1:

Draw a rectangle with sides $3x + 4$ and $4x + 2$



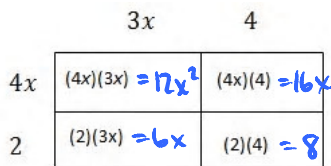
Step #2:

Divide the rectangle into 2 smaller rectangles



Step #3:

Calculate the area of each smaller rectangle



Step #4:

State your answer symbolically.

$$(3x+4)(4x+2) = 12x^2 + 16x + 6x + 8$$

$$= 12x^2 + 22x + 8$$

Try it! Expand the following expressions using an area model and write your answer symbolically.

1. $(x + 3)(2x + 1) = 2x^2 + 7x + 3$

2. $(3x + 5)(4x + 4) = 12x^2 + 32x + 20$

