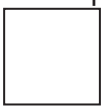
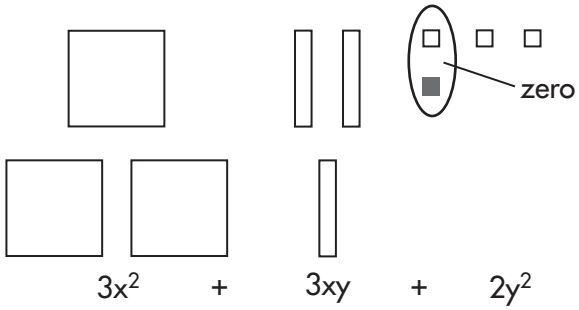
Introducing Adding & Subtracting Polynomials

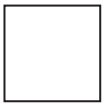
Tell students that when adding polynomials, you employ the Zero Principle wherever it's possible and then combine tiles that represent like terms.

Example 1: Let  represent x^2, ▭ represent xy, and □ represent y^2.

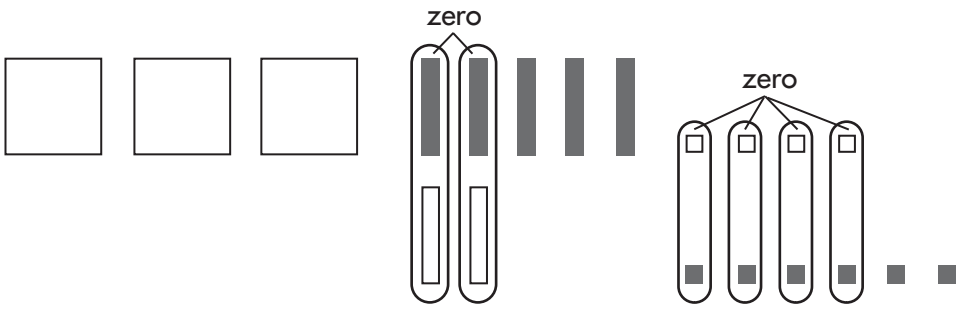
$$\begin{array}{r} x^2 + 2xy + 3y^2 \\ +\ 2x^2 + xy - y^2 \\ \hline \end{array}$$



$3x^2 + 3xy + 2y^2$

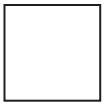
Example 2: Let  represent x^2, ▭ represent x, and □ represent 1.

$$\begin{array}{r} 3x^2 - 5x + 4 \\ +\ 2x - 6 \\ \hline \end{array}$$

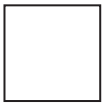


$3x^2 - 3x - 2$

Tell students that when subtracting polynomials, you "take away" tiles that represent the subtrahend or bottom portion of the equation.

Example 1: Let  represent x^2, ▭ represent xy, and □ represent y^2.

$$\begin{array}{r} 2x^2 - 5xy + 3y^2 \\ -\ (x^2 - 2xy + y^2) \\ \hline x^2 - 3xy + 2y^2 \end{array}$$

Example 2: Let  represent x^2, ▭ represent xy, and □ represent 1.

$$\begin{array}{r} 3x^2 - 7x + 4 \\ -\ (x^2 - 2x + 2) \\ \hline 2x^2 - 5x + 2 \end{array}$$

Using the Zero Principle in Subtraction

Explain that the "take away" method works well when there are tiles readily available to take away. When there aren't enough of the right tiles to "take away," students can apply the zero principle and then subtract.

$$\begin{array}{r} 2x^2 - 7x + 4 \\ -\ (x^2 + 2x + 2) \\ \hline \end{array}$$

There are no x tiles to take away, only – x tiles. However, you can provide as many x tiles as you need by applying the Zero Principle. Since you need two x tiles, you can represent the problem as follows:

$2x^2 - 7x + 4$

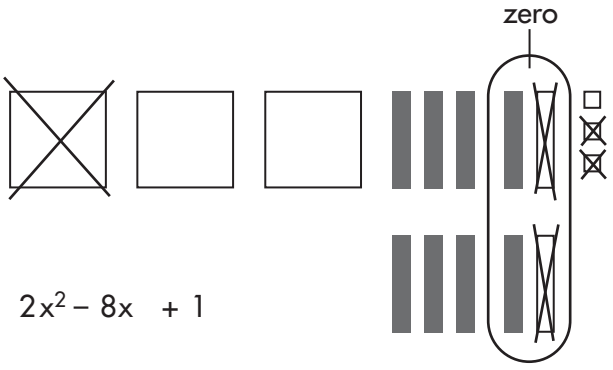
Now, take away the tiles that represent the subtrahend $x^2 + 2x + 2$ and count the remaining tiles to determine the difference.

The model above shows that the subtrahend tiles have been taken away leaving $x^2 - 9x + 2$.

Practicing the Concept

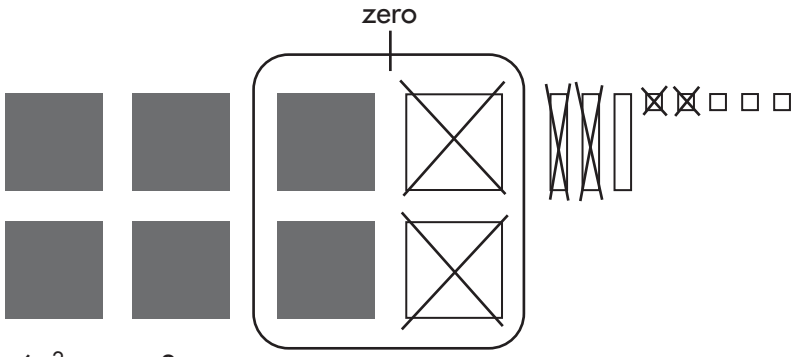
Post the following addition and subtraction exercises on the board. Allow students to combine tile sets and draw model tiles as they work through each problem.

$$\begin{array}{r} 3x^2 - 6x + 3 \\ -\ (x^2 + 2x + 2) \\ \hline \end{array}$$



$2x^2 - 8x + 1$

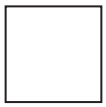
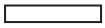
$$\begin{array}{r} -4x^2 + 3x + 5 \\ -(2x^2 + 2x + 2) \\ \hline \end{array}$$



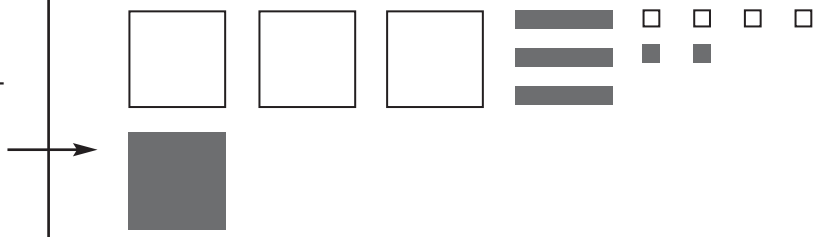
$-6x^2 + x + 3$

Adding & Subtracting Polynomials Worksheet 1

Name _____

Let  represent x^2,  represent x, and  represent 1.

Add the following polynomials. Use your Algebra Tiles™ and draw tile models to help you solve the problems. Remember to apply the Zero Principle first and then add.

Problem	Model
1. $3x^2 - 2x + 4$ $+(-x^2 - x - 2)$	
2. $4x - 3$ $+(-x - 2)$	
3. $5x^2 + 6$ $+(2x^2 - 2)$	
4. $-4x^2 - 3x - 6$ $+(2x^2 - x + 4)$	