

# Combining Like Terms in Polynomials

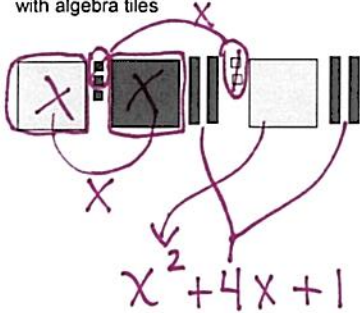
Model using counters

$(-4) + (+2)$  *cancel*  $= 00$  or  $(-2)$

Cancel out the zero pairs to find your answer.

The Zero Principle:

You can use the same principle with algebra tiles



1. Group like tiles
2. Remove zero pairs
3. Write simplified polynomial

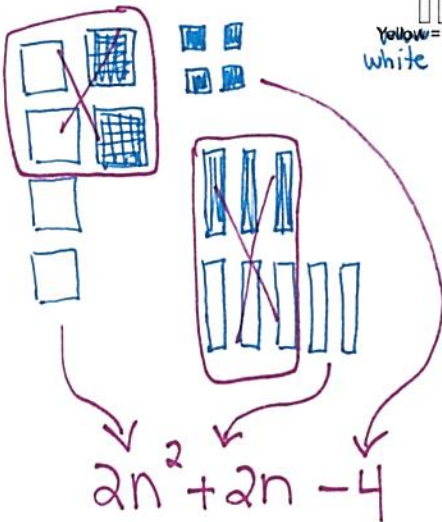
A polynomial is in simplest form when :

- its algebra tile model uses the fewest tiles possible
- its written (symbolic) form contains only one term of each degree and no terms with a zero coefficient.

Terms that can be represented with the same SHAPE of algebra tile are said to be "like terms" and can be combined to simplify a polynomial.

Example 1: Using Algebra Tiles to Simplify a Polynomial

$4n^2 - 1 - 3n - 3 + 5n - 2n^2$



Yellow = Positive  
Red = Negative

1. Group like tiles
2. Remove zero pairs
3. Write simplified polynomial

Example 2: Simplifying a Polynomial Symbolically (without tiles)

$4n^2 - 1 - 3n - 3 + 5n - 2n^2$

1. Rewrite in standard form, grouping like terms.
2. Add the coefficients of like terms to combine them.

$4n^2 - 2n^2 - 3n + 5n - 1 - 3$

$2n^2 + 2n - 4$

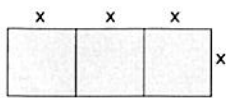
$14x^2 - 11 + 30x + 3 + 15x - 25x^2$

$14x^2 - 25x^2 + 30x + 15x - 11 + 3$

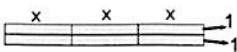
$-11x^2 + 45x - 8$

Example 3: Situations that Represent Polynomials

Write a simplified polynomial that represents the perimeter of each rectangle.



$P = 5 + 5 + 5 + 5$   
 $= 3x + x + 3x + x$   
 $= 18x$



$P = 5 + 5 + 5 + 5$   
 $= 3x + 2 + 3x + 2$   
 $= 6x + 4$

Example 4: Simplifying a Polynomial in Two Variables

$4xy - y^2 - 3x^2 + 2xy - x - 3y^2$

1. Rewrite in standard form, grouping like terms.
2. Add the coefficients of like terms to combine them.

$-3x^2 - y^2 - 3y^2 + 4xy + 2xy - x$

$-3x^2 - 4y^2 + 6xy - x$