Chapter 7 Get Ready

Language of Polynomials

Polynomials are made up of terms that are connected by addition or subtraction. For example, $4x^2 - 8x + 2$ has three terms. Some polynomials have specific names depending on the number of terms that are included:

• A *monomial* has one term.

• A *binomial* has two terms.

• A *trinomial* has three terms.

All expressions with one or more terms are called *polynomials*.

You can determine the degree of a term by adding the exponents of the variable(s) in the term. Polynomials have a degree the same as the highest degree term. $7b^2 + 3b - 11$ has degree 2 because the highest degree term, $7b^2$, has degree 2.

1. For each expression, state whether it is a monomial, binomial, or trinomial. Then, identify the polynomial degree.

a) $x^2 - 2x + 5$ **b)** $3y^2 - 9y$
c) $11c + 14$ **d)** $24d^2$

2. Create a polynomial that meets these conditions:
• contains two variables
• has three terms
• is of degree 2

Equivalent Expressions

Like terms differ only by their numerical coefficients. Like terms can be combined. Unlike terms cannot be combined.

Like terms: $3x$ and $-5x$ can be combined as $-2x$.

$-4k^2$ and $0.5k^2$ can be combined as $-3.5k^2$.

Unlike terms: $2t$ and t^2 cannot be combined.

$-pq$ and $6p$ cannot be combined.

3. Which of the following expressions are equivalent to $3n^2$?

a) $3n + n$ **b)** $2n^2 + n^2$
c) $4n^2 – 1$ **d)** $–7n^2 + 10n^2$

4. Simplify by collecting like terms.
a) $x^2 – 6x + 2x^2 + 5$
b) $4p^2 – 2p + p + 2 – p^2$
c) $–2g^2 – 7n + 4g^2 + 3n$
d) $17 + s^2 – 2s^2 + 5 + 9s – 2$

Using a Model to Add and Subtract Polynomials

You can model adding or subtracting polynomials to help simplify the expression.

$$(3x^2 + 2x) \quad + \quad (x^2 – x + 2)$$

= positive x^2-tile

= positive x-tile

Group like terms. Remove any zero pairs.

= negative x-tile

$4x^2 + x + 2$

= positive 1-tile
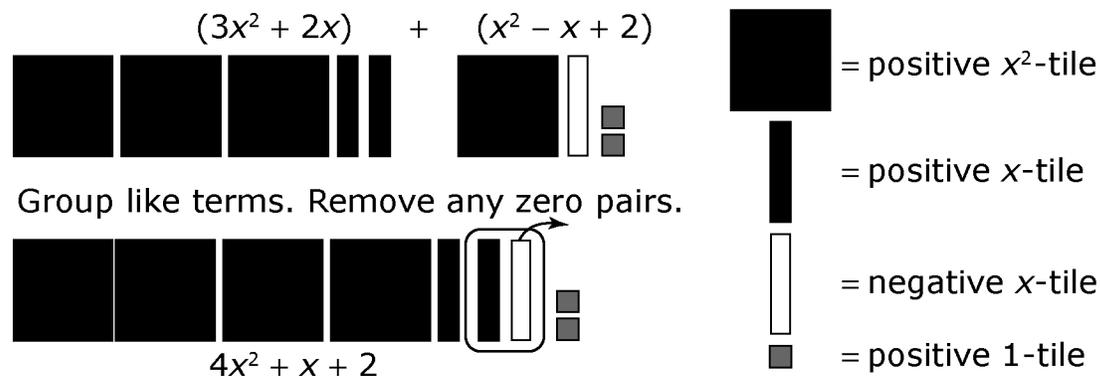
5. Add the polynomials.
a) $(5x – 7) + (2x – 3)$
b) $(–z^2 – 5z + 2) + (–7z^2 + 2z)$
c) $(6m + 6) + (6m – 6)$
d) $(2t^2 – 5) + (3t + 6)$

6. Subtract the polynomials.
a) $(2s – 4) – (2s + 3)$
b) $(–y^2 + 3y – 2) – (–2y^2 – 2y)$
c) $(4b + 7) – (6b + 8)$
d) $(–3r^2 – 5) – (3r – 2)$

Using Opposites to Subtract Polynomials

The opposite of a polynomial is found by taking the opposite of each term.
The opposite of $2x^2 + 3x – 7$ is $–2x^2 – 3x + 7$.
To subtract polynomials, you can add the opposite.
$(4x^2 + x + 2) – (2x^2 + 3x – 7) = (4x^2 + x + 2) + (–2x^2 – 3x + 7)$
$$= 4x^2 – 2x^2 + x – 3x + 2 + 7$$
$$= 2x^2 – 2x + 9$$

7. Subtract the polynomials.
a) $(5x^2 + 3x – 7) – (2x^2 – 5x + 3)$ **b)** $(2y^2 + 3y – 3) – (2y^2 + 4y + 6)$
c) $(–3r^2 + 2r + 1) – (–6r^2 – 8r – 6)$ **d)** $(–7s^2 – 13s – 9) – (2s^2 – 15s – 5)$