

5.1 The Language of Mathematics

MathLinks 9, pages 174–182

Key Ideas Review

Choose from the following terms to complete the statements in #1 to 3.

binomial
symbols

exponents
trinomial

highest
variables

monomial

polynomial

- Algebra uses _____, often letters, to represent unknown numbers or quantities. These unknown values are called _____.
- A _____ is made up of terms. Some of these expressions have special names, depending on the number of terms they have.
 - A _____ has one term.
 - A _____ has two terms.
 - A _____ has three terms.
- Each algebraic term has a degree, which you can find by adding the _____ of the variables in the term. A polynomial has the same degree as its _____-degree term.

Check Your Understanding

- For each expression, identify the number of terms and state whether it is a monomial, binomial, trinomial, or polynomial.
 - $2x - 5$
 - 10
 - $3z^2 - 6z + 7$
 - $b^2 - ab - 4d + e^2$
- For each expression, state the number of terms and the expression's degree.
 - $ef + gh$
 - $g^2 - 3g$
 - 10
 - $3s^2t - 2$

6. Refer to the following polynomials to answer the questions below.

$$4c^2 - 3c + 2$$

$$4ab$$

$$2f - 4$$

$$-12$$

$$5p^2 - r$$

$$g + h + j$$

Which of the above polynomials

a) are trinomials?

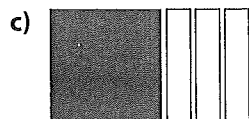
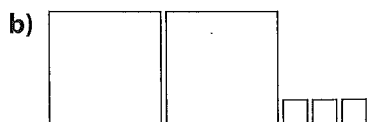
b) have a degree of 2?

c) have a degree of 0?

d) are monomials?

e) have a coefficient of 4?

7. Write the expression represented by each set of algebra tiles. Shaded tiles are positive and white tiles are negative.



8. Sketch a model that represents the polynomial.

a) $x^2 + 3x - 2$

b) $-x^2 - 2x + 1$

9. Write an algebraic expression for each of the following:

a) the sum of 7 and x^2

b) the difference of $3x$ and 9

c) the product of x and 4

10. Use the given variables to write each statement as an algebraic expression.

a) If n is a number, the product of the number and 5

b) If w is the width of a rectangle and its length is 5 cm more than its width, the area of rectangle

c) If x is the number of kilometres, the cost of renting a car, in dollars, if the charge is \$40 plus \$0.80 per kilometre

5.2 Equivalent Expressions

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Key Ideas Review

1. Complete the following statements.

- a) In the monomial $6ab$, the variables are _____ and _____.
- b) In the monomial $-7wx^2$, the coefficient is _____. The variables are w and x .
The exponent for w is _____ and the exponent of x is _____.
- c) For the monomial 18 , is there a coefficient or variable? YES NO

2. In the three *like* terms below, circle what is *alike* among them. Then, combine the terms.

$3x^2$ $-4x^2$ $-x^2$ Combined term: _____

3. Are the terms below like terms? YES NO Explain.

$5x$ $5x^2$ $5y$

Check Your Understanding

4. For each of the following, state the value of the coefficient. Then, state the number of variables for each term.

- a) y b) $-3b^2$
- c) $6st$ d) -15
- e) $-dh$ f) bc

5. Use the following monomial expressions to answer the questions below.

$-cd$ $9r$ $4x$ k^2 $-xy$ $-3jk$

- a) Which have a coefficient of -1 ?
- b) Which have two variables?
- c) Which have a coefficient of 1 ?
- d) Which have only one variable, with an exponent of 1 ?

6. Circle the like terms in each group.

a) 14 $3r$ $-r^2$ $-r$ $3s$

b) $-4y$ $8xy$ $2x$ $0.3y$ $\frac{y}{2}$

c) $12c$ cd $1.2d$ $6cd$ cd^2

7. Rearrange the polynomial by grouping like terms.

a) $9 - 5c - 8 + 5c^2 + c - c^2$

b) $8m - 9 + 2m^2 + 6 + 3m^2 - 6m$

c) $-5d^2 + 3d - 2 + 6d^2 - 8d + 7$

8. Rearrange each polynomial by grouping like terms. Then, simplify by adding or subtracting.

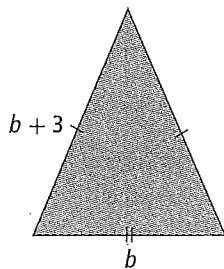
a) $-b^2 + 6 + 5b^2 - 8 + 9$

b) $7t + 14 + 6t - 5 - 3t^2 + 4t^2$

c) $5n - 3n^2 - 7 + 9n + 3 - 2n^2$

d) $3y^2 + 4 - 6y^2 - 6 + 3y - 5 + 2y$

9. Write and simplify an expression for the perimeter of the triangle by combining like terms.



10. a) Draw a figure with a perimeter that is represented by $(s) + (2s) + (s + 5) + (3s)$, where each value in parentheses represents the length of one side. Label each side length. Explain why you made each side the length that you did.

- b) Simplify the expression for the perimeter by combining like terms.

11. A mechanic charges \$70 an hour plus the cost of parts to repair a vehicle. The parts cost \$215 for the repair on Tamara's car.

- a) Write an expression for the total cost, C , of repairing Tamara's car for any number of hours, n .

- b) Use the expression you created in part a) to calculate the cost of repairs that take $3\frac{1}{2}$ h.

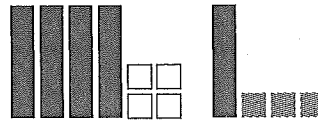
5.3 Adding and Subtracting Polynomials

MathLinks 9, pages 190–199

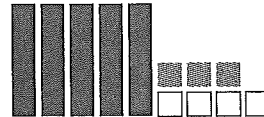
Key Ideas Review

1. Which equation does the algebra tile model represent? _____

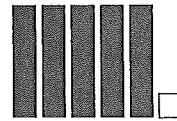
A $(4x - 4) + (x + 3) = 5x - 1$



B $(4x + 4) - (-x + 3) = 5x + 1$



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



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

2. One word can replace the question marks in the following sentences: The ? of a polynomial is found by taking the ? of each of the terms. To subtract polynomials, you can add the ?.

The word is _____.

Check Your Understanding

3. Add the polynomials.

a) $(6y - 4) + (2y + 2)$

b) $(b^2 + 5) + (-2b^2 - 3)$

c) $(-3s^2 + 7s) + (-s^2 - 6)$

4. Perform the indicated operation. Then, simplify by combining like terms.

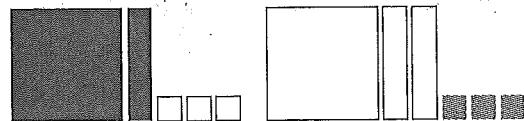
a) $(8 + 5d) + (-d - 9)$

b) $(-4m^2 - 4) + (-2m^2 - 1)$

c) $(-6r^2 + 3r - 7) + (5r^2 - 2r - 2)$

5. Which of the statements do the

algebra tiles represent? _____



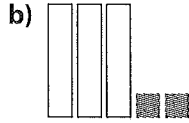
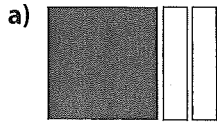
A $(x^2 + x - 3) + (x^2 - 2x + 3)$

B $(x^2 + x - 3) + (-x^2 - 2x + 3)$

C $(x^2 - x - 3) + (-x^2 - 2x + 3)$

D $(x^2 + x + 3) + (-x^2 - 2x + 3)$

6. Give the opposite of the expression.
Express your answer using both diagrams and symbols.



7. What is the opposite of each expression?

a) $-3y^2$

b) $6g - 3$

c) $2b^2 - 4b + 7$

d) $-4d^2 - 3d - 6$

e) $-k^2 - 8k + \frac{1}{2}$

8. Change the subtraction operation to adding the opposite. Then, combine like terms.

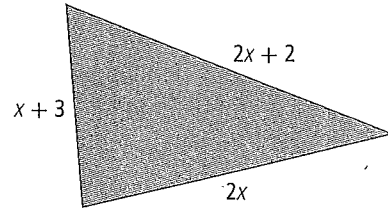
a) $(3r - 5) - (5r + 2)$

b) $(6 - 3f) - (4 - 5f)$

c) $(-4n^2 + 5) - (-n^2 - 9)$

d) $(6a^2 + 2a - 5) - (4a^2 + 5a + 7)$

9. Consider the triangle below.



- a) Write the unsimplified expression for the perimeter.

- b) Simplify the expression from part a) by combining like terms.

- c) If the perimeter of the triangle is 25 cm, calculate the value of x .
Verify that your answer is correct.

10. José, Tyler, and Mike split some money they made working on the weekend. They each worked a different number of hours, so they have to split the money fairly. José receives twice the amount that Tyler receives, and Mike receives \$10 less than Tyler. Let x represent the amount that Tyler receives.

- a) Write the expression that represents the total amount that they receive.

- b) Simplify the expression in part a) by combining like terms.