

Adding & Subtracting Polynomials

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Mathematics 9 Polynomials Adding & Subtracting Polynomials

A. Definitions

1. **algebraic order:** terms in an algebra expression written in alphabetical order.
② Terms with higher exponents are written ahead of terms with lower exponents. ③ The constant is always written last.

$$2ab + 3b^2 - 5b + 7$$

2. **like terms:** terms which have the same variable(s) and exponent combinations.

$$3a^2b \neq -8a^2b$$

3. **adding the opposite:** a process where you change all the signs for the terms in a set of brackets with negative (subtraction) sign in front.

$$-(2x - 3y + 6) = -2x + 3y - 6$$

B. Examples

1. Determine the opposite of each term.

2	4x	-3m	$7m^2n$	$-ab^2c^3$
-2	$-4x$	$3m$	$-7m^2n$	ab^2c^3

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

a)



$$-3x + 1$$

b)



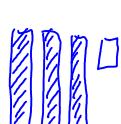
$$x^2 + 2x + 2$$

c)

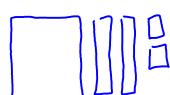


$$-x^2 + 2x - 4$$

- b) Draw the opposite of each set of algebra tiles above and state the new expression.



$$3x - 1$$



$$-x^2 - 2x - 2$$



$$x^2 - 2x + 4$$

3. Add or subtract the following.

a) $2a - 1 + 6 - 4a$

$$\boxed{-2a + 5}$$

b) $5x + (8 - 3x)$

$$\boxed{5x + 8 + 3x}$$

$$\boxed{8x + 8}$$

c) $(3t^2 - 5t) + (t^2 + 2t - 1)$

$$\boxed{3t^2 - 5t + t^2 + 2t - 1}$$

$$\boxed{4t^2 - 3t - 1}$$

d) $9 - (2x + 3)$

$$\boxed{9 - 2x - 3}$$

$$6 - 2x$$

$$\boxed{-2x + 6}$$

e) $(y + 3) - (4y + 3)$

$$\boxed{y + 3 - 4y - 3}$$

$$\boxed{-3y}$$

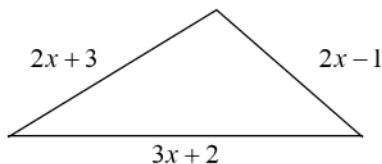
f) $(4x + 2y - 3) - (-3x - 9y + 2)$

$$\boxed{4x + 2y - 3 + 3x + 9y - 2}$$

$$\boxed{7x + 11y - 5}$$

4. Use the triangle below to answer the following.

a) Write an expression to determine the perimeter of the triangle.



$$(2x + 3) + (2x - 1) + (3x + 2)$$

$$2x + 3 + 2x - 1 + 3x + 2$$

b) Simplify the expression by combining like terms.

$$\boxed{2x + 3 + 2x - 1 + 3x + 2}$$

$$\boxed{7x + 4}$$

c) If $x = 3 \text{ cm}$, calculate the perimeter of the triangle.

$$\begin{aligned} &7x + 4 \\ &7(3) + 4 \end{aligned}$$

$$21 + 4$$

$$= \boxed{25 \text{ cm}}$$

Assignment: 5.3 Adding & Subtracting Polynomials Assignment

5.3 Adding and Subtracting Polynomials

MathLinks 9, pages 190–199

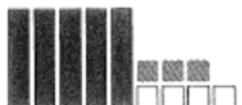
Key Ideas Review

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

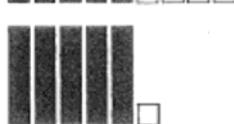
A $(4x - 4) + (x + 3) = 5x - 1$



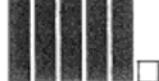
B $(4x + 4) - (-x + 3) = 5x + 1$



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

5. Which of the statements do the

algebra tiles represent? _____

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



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

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

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

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

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

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

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

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

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

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.

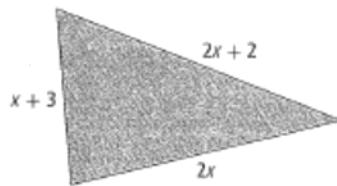
a) $(3r - 5) - (5r + 2)$

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.

5.3 Adding and Subtracting Polynomials

1. A 2. opposite

3. a) $8y - 2$ b) $-b^2 + 2$ c) $-4s^2 + 7s - 6$
4. a) $4d - 1$ b) $-6m^2 - 5$ c) $-r^2 + r - 9$

5. B



$$-x^2 + 2x$$



$$3x - 2$$

7. a) $3y^2$ b) $-6g + 3$ c) $-2b^2 + 4b - 7$
d) $4d^2 + 3d + 6$ e) $k^2 + 8k - \frac{1}{2}$

8. a) $(3r - 5) + (-5r - 2); -2r - 7$
b) $(6 - 3f) + (-4 + 5f); 2 + 2f$
c) $(-4n^2 + 5) + (n^2 + 9); -3n^2 + 14$
d) $(6a^2 + 2a - 5) + (-4a^2 - 5a - 7);$

$$2a^2 - 3a - 12$$

9. a) $(x + 3) + (2x + 2) + (2x)$
b) $5x + 5$ c) $x = 4$; Verify: $5(4) + 5 = 25$

10. a) $x + 2x + (x - 10)$ b) $4x - 10$