

# Adding & Subtracting Polynomials

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11:15 AM

## Mathematics 9 Polynomials Adding & Subtracting Polynomials

### A. Definitions

1. **algebraic order:** <sup>①</sup> terms in an algebra expression written in alphabetical order. <sup>②</sup> Terms with higher exponents are written ahead of terms with lower exponents. <sup>③</sup> 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.

$$\begin{array}{ccccc} 2 & 4x & -3m & 7m^2n & -ab^2c^3 \\ \boxed{-2} & \boxed{-4x} & \boxed{3m} & \boxed{-7m^2n} & \boxed{ab^2c^3} \end{array}$$


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

a)




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

b)



$$\boxed{x^2 + 2x + 2}$$

c)

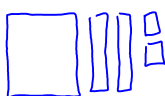


$$\boxed{-x^2 + 2x - 4}$$


- 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)  $(2a - 1) + (6 - 4a)$   
 $-2a + 5$

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

c)  $(3t^2 - 5t) + (t^2 + 2t - 1)$   
 $4t^2 - 3t - 1$

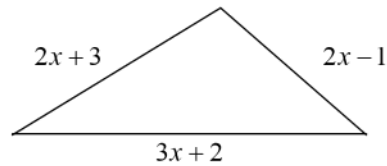
d)  $9 - (2x + 3)$   
 $9 - 2x - 3$   
 $6 - 2x$   
 $-2x + 6$

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

f)  $(4x + 2y - 3) - (-3x - 9y + 2)$   
 $4x + 2y - 3 + 3x + 9y - 2$   
 $7x + 11y - 5$

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.

$2x + 3 + 2x - 1 + 3x + 2$   
 $7x + 4$

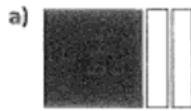
c) If  $x = 3 \text{ cm}$ , calculate the perimeter of the triangle.

$7x + 4$   
 $7(3) + 4$   
 $21 + 4$   
 $= 25 \text{ cm}$

Assignment: 5.3 Adding & Subtracting Polynomials Assignment



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



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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.

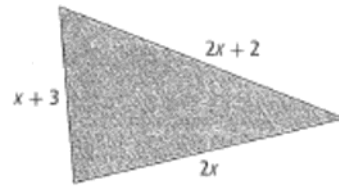
a)  $(3r - 5) - (5r + 2)$

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.

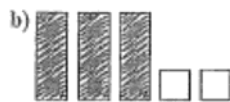
- b) Simplify the expression in part a) by combining like terms.

### 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)  $(-4m^2 + 5) + (m^2 + 9)$ ;  $-3m^2 + 14$   
 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)  $4x - 10$