Math 10 Lecture Videos

Section 1.4
Basic Rules of Algebra

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OBJECTIVES:

1. Understand and use the vocabulary of algebraic expressions.
2. Use commutative properties.
3. Use associative properties.
4. Use distributive properties.
5. Combine like terms.
6. Simplify algebraic expressions.

Objective 1: Understand and use the vocabulary of algebraic expressions

$2x + 8$

TERMS

- Parts that are separated by addition or subtraction
- $2x$ is a term and 8 is another term.

COEFFICIENT

- The numerical part of the term
- In the term $2x$, 2 is the coefficient.

LIKE TERMS

- Have exactly the same variable part
- 5x and 8x are like terms.
- 2y and 7y are like terms.
- 5x and 2y are unlike terms.

Objective 1: Understand and use the vocabulary of algebraic expressions

EXAMPLES

Algebraic Expression	Number of Terms	Coefficients	Like Terms
$6y - 3x - 4y + 8$	4	6, -3, - 4, 8	6y and - 4y
$5x^2 + 2y - 2x^2 + 9 - 3y$	5	5, 2, -2, 9, -3	$5x^2$ & $-2x^2$; 2y & -3y
$6x^2 - 9y + 4x + 8 - y + 5$	6	6, -9, 4, 8, -1, 5	-9y & -y; 8 & 5

Objective 2:
Use Commutative Properties

Let *A* and *B* represent real numbers, variables or algebraic expressions.

Commutative Property of Addition	Changing order in addition does not affect the sum.	A + B = B + A	Example: X + 14 = 14 + X
Commutative Property of Multiplication	Changing order in multiplication does not affect the product.	AB = BA	Example: 7y = y7

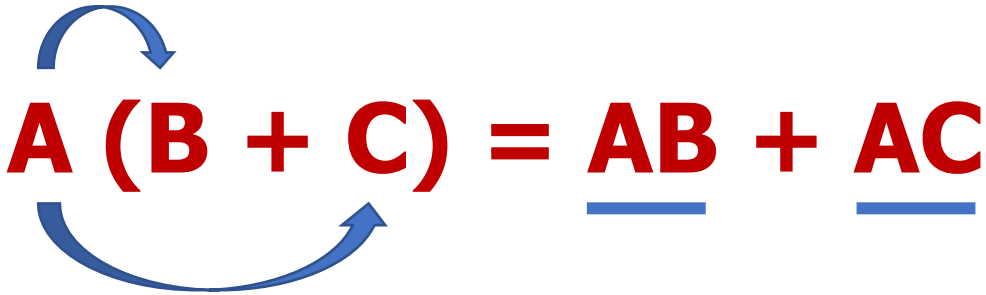
Objective 3:
Use Associative Properties

Let *A, B and C* represent real numbers, variables or algebraic expressions.

Associative Property of Addition	Changing grouping when adding does not affect the sum.	(A + B) + C = A + (B + C)	Example: 8 + (X + 4) = (8 + X) + 4 = 12 + X or X + 12
Associative Property of Multiplication	Changing grouping when multiplying does not affect the product.	(AB)C = A(BC)	Example: 6(5X) = (6*5)X = 30X or X30

Objective 4:
Use Distributive Properties

Let *A, B and C* represent real numbers, variables or algebraic expressions.



Multiplication distributes over addition.

Objective 4:
Use Distributive Properties

Examples

Multiply: $5(x+3)$

$= 5(x + 3)$
$= 5x + 5*3$
$= 5x + 15$

Multiply: $6(4y+7)$

$= 6(4y + 7)$
$= 6*4y + 6*7$
$= 24y + 42$

Objective 5: Combine like terms

Add or subtract the coefficients of the terms.

Examples:

(a) $7x + 3x$

$= 7x + 3x$
$= (7 + 3)x$
$= 10x$

(b) $9a – 4a$

$= 9a – 4a$
$= (9 - 4)a$
$= 5a$

Objective 5: Combine like terms

Examples:

(c) $2x + 8 + 5x + 7$

$= (2x + 5x) + (8 + 7)$
$= (2+5)x + 15$
$= 7x + 15$

(d) $3y + 2x + 4x + 7y$

$= (2x + 4x) + (3y + 7y)$
$= (2+4)x + (3+7)y$
$= 6x + 10y$

Objective 6:
Simplify algebraic expressions

Simplifying Algebraic Expressions	
1.	Use the distributive property to remove parentheses.
2.	Rearrange terms and group like terms using the commutative and associative properties. This step may be done mentally.
3.	Combine like terms by combining the coefficients of the terms and keeping the same variable factor.

Objective 6:
Simplify algebraic expressions

Simplify: $3(2x + 5) - 7$

$= 6x + 15 - 7$ Use the distributive property to remove the parenthesis.

$= 6x + 8$ Combine like terms.

Objective 6:
Simplify algebraic expressions

Simplify: $3(2a + 4b) + 2(2a + 3b)$

$= 6a + 12b + 4a + 6b$

Use the distributive property to remove the parenthesis.

$= (6a + 4a) + (12b + 6b)$

Use the associative and commutative properties to rearrange and group like terms

$= 10a + 18b$

Combine like terms

Objective 6:
Simplify algebraic expressions

Simplify: $3a - (2a + 4b - 6c) + 6b - 3c$

$= 3a - 2a - 4b + 6c + 6b - 3c$ Use the distributive property.

$= (3a - 2a) + (6b - 4b) + (6c - 3c)$ Use the commutative and associative properties.

$= a + 2b + 3c$ Simplify

OBJECTIVES:

- Understand and use the vocabulary of algebraic expressions. ✓
- Use commutative properties. ✓
- Use associative properties. ✓
- Use distributive properties. ✓
- Combine like terms. ✓
- Simplify algebraic expressions. ✓