

Name: _____ Period: _____ Date: _____

UNIT 1 NOTES: COMBINING LIKE TERMS

Term: a number, a variable or a product or quotient of numbers or variables that is added or subtracted in an algebraic expression.

- *There are 4 terms in the following expression: $2x - 4y + 7z + 3$*

Variable: a symbol (usually a letter) used to represent a quantity that can change.

Coefficient: a number that is multiplied by a variable.

- *In the term $2x$, 2 is the coefficient. This means 2 times the quantity x .*
- *In the term x , the coefficient is understood to be 1, even though the number is not written.*

Constant: a term in an algebraic expression that does not change; it does not contain variables.

- *In the expression $x + 2$, 2 is a constant.*

Like Term: a term that has the same variable (letter) raised to the same power.

- *The expression $2x + 7x + 3 - 2$ can be written as an equivalent expression $9x + 1$ after combining like terms.*
- *The expression $2x - 4y + 7z + 3$ cannot be simplified because none of the terms are like terms.*
- More examples:
 - a) 2 and 3 are like terms (*both are constants*)
 - b) $3x$ and $2x$ are like terms (*same variable*)
 - c) $3x$ and $2y$ are NOT like terms (*different variables*)
 - d) $3ab$ and $2ab$ are like terms (*same variable*)
 - e) $3x$ and $3x^2$ are NOT like terms (*different powers of x*)
 - f) $3xy$ and $2yx$ are like terms (*Commutative Property of Multiplication: order does not matter: $xy = yx$*)

ADDITION AND SUBTRACTION: ONLY LIKE TERMS CAN BE COMBINED.

- 1) Simplify (eliminate any parentheses if needed)
- 2) Combine like terms by adding or subtracting the coefficients of all like terms.

Examples:

- a) $3x + 2x = 5x$
- b) $3x + 2y$ (CANNOT BE SIMPLIFIED)
- c) $3x + 10 + 3y + 2x - 2y + 13 = 5x + y + 23$

Name: _____ Period: _____ Date: _____

INTEGER OPERATIONS

1. A negative times/divided by a negative makes a positive
2. A negative times/divided by a positive makes a negative
3. When adding and subtracting, the sign of the “largest” number will remain

The Process of Combining Like Terms

1. Because signs often get “lost” in the combining process, the most usual first step is to **put parenthesis around every variable or constant**

* this is the most important step you can do to insure a mistake free process!!!

ex. $2x + 3y - 4x - 7y + 9xy - 7xy$ could be rewritten

$$(+2x) + (+3y) + (-4x) + (-7y) + (+9xy) + (-7xy)$$

1b. If necessary perform any multiplication (such as the distributive property) at this point in time and then put parenthesis around every variable again.

2. Once the signs are clear, **underline/bracket/circle like terms**

$$\underline{(+2x)} + \underline{(+3y)} + \underline{(-4x)} + \underline{(-7y)} + (+9xy) + (-7xy)$$

3. If the like terms are not already next to each other you can **regroup** them; this is optional.

$$\underline{(+2x)} + \underline{(-4x)} + \underline{(+3y)} + \underline{(-7y)} + (+9xy) + (-7xy)$$

4. **Combine** (meaning add or subtract) the like terms

$$\underline{(+2x)} + \underline{(-4x)} = -2x$$

$$\underline{(+3y)} + \underline{(-7y)} = -4y$$

$$\underline{(+9xy)} + \underline{(-7xy)} = -2xy$$

5. **Rewrite** as one sequence

$$-2x - 4y - 2xy$$

The Beginnings of the Most Common Mistake

The beginnings of the most common mistake occurs when there is a negative constant multiplied by a set of terms inside parentheses; a lot of times the negative is left out of the process. To avoid this, start by bracketing it off and make sure you recognize that the subtraction is really adding a negative.

$$\text{Ex. } -2(x - y) = (-2)((+x) + (-y)) = (-2)(x) + (-2)(-y) = -2x + 2y$$

Name: _____ Period: _____ Date: _____

The Most Common Mistake

The most common mistake happens when there is a long sequence and a negative is mistaken for subtraction.

$$\begin{aligned}2(x - y) - 4(x + y) &= (2)((+x) + (-y)) + (-4)(x + y) = 2x + 2(-y) + (-4)x + (-4)y \\ &= 2x - 2y - 4x - 4y \\ &= -2x - 6y\end{aligned}$$

Extra Practice Problems:

1. $3x + 8 - x$

2. $2(x - 3)$

3. $-2(x - 3)$

4. $x + 1 + x^2 + 4x + 4$

5. $x + yx - 6xy + 7y - 8x + 2(x + y)$

6. $x(x + 5) - 3(x + 2)$

7. $-4(2 + x) - 2(x + 3) = 4$

8. $-3(x + 9)$

9. $4(x - 4) - 3x = 10$

10. $3(-2x + 1) = 21$