

1.3 Combining Like Terms

Before you can **COMBINE LIKE TERMS** you need to know what a term is.

* Term: is a number, a variable, or the product of a number and one or more variables.

$6a^2$ $-5ab$ 12 ↖ C It is implied, there is a 1!

• Constant: is a term that has **NO VARIABLES** it does not change its value and it represents a number. -2 0 15 2.5 $\frac{1}{3}$

• Coefficient: is the number that is multiplied with a variable; it is the number in front of the variable. $6a^2$ $-5ab$ $12c$
↖ coeff. ↗

In an algebraic expression, terms are separated by addition and subtraction symbols. You must first use the Distributive Prop. before determining the number of terms an expression has.

$-2(x+7)+5 \rightarrow -2x-14+5 \rightarrow (-2x-9)$ 2 terms

Example 1: For each expression identify the variable(s), coefficient(s), the constant, and then state the number of terms the expression has.

Expression	Variable(s)	Coefficient(s)	Constant	# of Terms
a. $-2x+5$	x	2	5	2
b. $7-13y+3x$	y, x	$-13, 3$	7	3
c. $-3b^2-4a+7-10c^3$	b^2, a, c^3	$-3, -4, -10$	7	4
d. 5	none	none	5	1
e. $-6(x+3)$	x	-6	-18	2

$-6x-18$

Algebraic expressions can be simplified by combining like terms. Like Terms are terms that have **EXACTLY** the same variable(s) and exponents.

Example 2: Are the terms in each example like terms or not. If not, explain why.

a. $3x$ and $2x$ Yes, like terms!	b. $4ab$ and $2b$ No, because they do not have the same variables.	c. $5m$ and $6m^2$ No, because exponents are not the same!	d. $3xy^2z^3$ and z^3xy^2 Yes! same variables in exponents.	e. -6 and 8 Yes, the terms are constants.
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To completely simplify an algebraic expression means to put an expression in a form where there are

No grouping symbols and no like terms.

- To get rid of grouping symbols use the Distributive Property.
- To combine like terms rewrite the like term next to each other (DON'T FORGET THE + OR - SIGN WHEN YOU REWRITE THE TERMS) and then add or subtract the coefficients and constants.
- Your answers should be arranged so that the variables are in alphabetical order first, then in order from biggest to smallest exponent. This called STANDARD FORM.

$$x^2 + 5 - 2x^3 + 3x \rightarrow -2x^3 + x^2 + 3x + 5$$

Example 3: Completely simplify each expression and write your answer in STANDARD FORM.

<p>a. $6(m+3)$</p> <p>$6m + 18$</p>	<p>b. $3x^2 + 8x^2 + 7x^2$</p> <p>*DON'T ADD THE EXPONENTS!</p> <p>$11x^2 - 7x^3$</p> <p>$-7x^3 + 11x^2$</p>	<p>c. $4(2-p^3) + 6 - 8p^3$</p> <p>$8 - 4p^3 + 6 - 8p^3$</p> <p>$-4p^3 - 8p^3 + 8 + 6$</p> <p>$-12p^3 + 14$</p>	<p>d. $3(r-4) - 5(2r+1)$</p> <p>$3r - 12 - 10r - 5$</p> <p>$3r - 10r - 12 - 5$</p> <p>$-7r - 17$</p>
<p>e. $7b - [8 + 6(b-1)]$</p> <p>$7b - 8 + 6b - 6$</p> <p>$7b - 6b - 8 - 6$</p> <p>$1b - 14$</p>	<p>f. $-7 - 8x + 14y + 6x^2$</p> <p>$6x^2 - 8x + 14y - 7$</p>	<p>g. $(2-x)(7) + 3(x-4)$</p> <p>$14 - 7x + 3x - 12$</p> <p>$-7x + 3x + 14 - 12$</p> <p>$-4x + 2$</p>	<p>h. $8y^2 - 5xy + 4yx - y^2 + 4$</p> <p>$8y^2 - y^2 - 5xy + 4xy + 4$</p> <p>$7y^2 - 1xy + 4$</p>