Simplifying Algebraic Expressions

Definition of a Term

A term is either a number, or a product of a number and one or more variables raised to an exponent.

Examples:

$7x^2$, $-4y$, x, 9

The number in front of the variable is called coefficient.

$7x^2$	$-4y$ (same as $-4y^1$)	x (same as $1x^1$)	9
7 is the coefficient x is the variable 2 is the exponent	-4 is the coefficient y is the variable 1 is the exponent	1 is the coefficient x is the variable 1 is the exponent	9 is called a constant.

Like Terms

Like terms are terms that have exactly the same letters (or variables) raised to the same exponents. The coefficients can be any number.

Examples:

$4x^3$ and $-7x^3$ are like terms.

$2y^6$ and $9y^3$ are like terms.

x^4 and $-3x^4$ are like terms.

6 and 4 are like terms.

Distributive Property

If a, b, and c are numbers, then

$$a(b+c) = ab + ac$$

Examples:

$$4(x+3) = 4x + 12$$

$$-5(2x-7) = -10x + 35$$

Examples:

Examples:	**Explanation:**
Simplify the expression. $2x + 5 + 7x - 6$ $= 9x - 1$	Combine $2x$ and $7x$ by adding their coefficient, then combine 5 and -6. $2x + 7x = 9x$ $5 + (-6) = -1$
Simplify the expression. $4x^3 - 2x^3 + 7x^3$ $= 9x^3$	All three terms are like terms, so we combine all three together.
Simplify the expression. $4(3x+5) - 10x$ $= 12x + 20 - 10x$ $= 2x + 20$	Use the distributive property to remove the parenthesis. Then combine $12x$ and $-10x$.

Simplify the expression. $2(3x^2 + 4) - 4(x^2 - 6)$ $= 6x^2 + 8 - 4x^2 + 24$ $= 2x^2 + 32$	Use the distributive property to remove both parentheses. Then combine $6x^2$ and $-4x^2$. Then combine 8 and 24.
Simplify the expression. $3a + 5b + 8a + 2b$ $= 11a + 7b$	Combine $3a$ and 8a. Then combine $5b$ and 2b.
Simplify the expression. $5(x - 3) - 5x + 15$ $= 5x - 15 - 5x + 15$ $= 0$	Use the distributive property to remove the parenthesis. Then combine $5x$ and $-5x$. Then combine -15 and 15.
Simplify the expression. $8x - (x + 4)$ $= 8x - 1(x + 4)$ $= 8x - x - 4$ $= 7x - 4$	Use the distributive property to remove the parenthesis. We can replace the "−" sign in front of the parentheses with -1. Then combine $8x$ and $-x$.