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Simplify Algebraic Expressions
(Chapter 7 Lesson 2)

When addition or subtraction signs separate an algebraic expression into parts, each part is called a <u>term</u>.

<u>Like terms</u> contain the same variables to the same powers.

<u>Like terms</u>	<u>Not like terms</u>
$7x, 4x$	$7x, 4$
$-7y^2, 2y^2$	$7x^2, -2x$
$3ab, 10ab$	$3y, 2x$
$-6, 12$	

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In an algebraic expression,
*the number being multiplied by the variable is called the <u>coefficient</u>
*a term that does not have a variable is called a <u>constant</u>

<u>Algebraic Expression</u>

$3n$	3 is the coefficient, there is no constant
$-4a + 7$	-4 is a coefficient, 7 is a constant
$5 - 2x$	-2 is a coefficient, 5 is a constant
x	1 is the coefficient since $x = 1x$
$-x$	-1 is the coefficient since $-x = -1x$

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Algebraic Expression	Terms	Like Terms	Coefficients	Constants
$7n - 9n - 4 + n$ $7n + {}^-9n + {}^-4 + 1n$	$7n, {}^-9n,$ $-4, 1n$	$7n, {}^-9n$ $1n$	$7, -9, 1$	-4
$4x^2 + 3x - 6$ $4x^2 + 3x + {}^-6$	$4x^2, 3x,$ -6		$4, 3$	-6
$4x - 5x + 7$ $4x + {}^-5x + 7$	$4x, -5x,$ 7	$4x$ and $-5x$	$4, -5$	7
$-6x^2 - x + 4x$ $-6x^2 + {}^-1x + 4x$	$-6x^2,$ $-1x,$ $4x$	$-1x, 4x$	$-6, -1, 4$	

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We may add terms in an algebraic expression IF they are LIKE TERMS.

$6x + 2x = \boxed{8x}$ versus $6x \cdot 2x$
                                    $6 \cdot x \cdot 2 \cdot x$
$10y - 6y = \boxed{4y}$ $12x^2$

$3x + x = \boxed{4x}$

$5x + 2x + 4 = \boxed{7x + 4}$

$-5x + 5 + 7x + 4 = \boxed{2x + 9}$

$-4x - 7x =$ $-4x + {}^-7x$ $= \boxed{-11x}$

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To simplify algebraic expressions:

"Rewrite all subtraction signs with their related addition problem
"Use distributive property to "clear parentheses"
"Use addition rules to add like terms

Examples:

$x + 6 + -8 + 2x$	$2x + 3(4x + 5)$	$8x^2 + 6 + 3x + 2x^2$
$3x + -2$	$2x + 12x + 15$	$10x^2 + 3x + 6$
$3x - 2$	$14x + 15$	

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$4x - 10x + 8 - 11$	$4 - 2(x + 5) + 7x$	$6 - 2x - 3(4x - 1)$
$4x + -10x + 8 + -11$	$4 + -2(x + 5) + 7x$	$6 + -2x + -3(4x + -1)$
$-6x + -3$	$4 + -2x + -10 + 7x$	$6 + -2x + -12x + 3$
$-6x - 3$	$5x + -6$	$-14x + 9$
	$5x - 6$	OR

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$$6 + -2x + -3(4x - 1)$$
$$6 + -2x + -3 \cdot 4x - -3(1)$$
$$6 + -2x + -12x - -3$$
$$6 + -2x + -12x + 3$$
$$-14x + 9$$

$$P = 2(l + w)$$

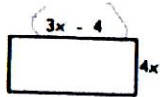Write a simplified algebraic expression for the perimeter and area of each rectangle.
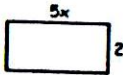
Perimeter

$$P = 2l + 2w$$
$$2(5x) + 2(2)$$
$$10x + 4 \text{ units}$$

Area

$$A = lw$$
$$5x(2)$$
$$10x \text{ sq units}$$

(rectangle: 5x by 2)

$$2l + 2w$$
$$2(3x - 4) + 2(4x)$$
$$6x - 8 + 8x$$
$$14x - 8 \text{ units}$$

(rectangle: 3x - 4 by 4x)

$$l \cdot w$$
$$4x(3x - 4)$$
$$\rightarrow 4x \cdot 3x - 4x \cdot 4$$
$$12x^2 - 16x \text{ sq units}$$

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