Examples
Introduction to Algebra

Based on power point presentations by Pearson Education, Inc.
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Learning Objectives

1. Use the vocabulary of algebra.
2. Use the *Distributive Property*.

Example 1: Use Algebra Vocabulary

Evaluate the expression $7 + 5x$ for $x = 6$.

$7 + 5x$, let $x = 6$

then $7 + 5(6)$ replaced x with 6

and $7 + 30$ evaluated the multiplication

which equals 37

Example 2: Use Algebra Vocabulary

a. Name the *term(s)* in the expression $7x + 9y - 3$.

The terms are $7x$, $9y$, and -3.

b. Name the *coefficient(s)* in the expression $7x + y - 3$.

The coefficients are 7 and 1.

c. Name the *constant term(s)* in the expression $7x + 9y - 3$.

The constant term is -3.

d. Name the *like terms* in the expression $2x + y - 3x$.

The like terms are $2x$ and $-3x$.

e. Name all *factors* of 36 .

The numbers 1, 2, 3, 4, 6, 9, 12, 36 are factors of 36 because they all divide into 36 without a remainder.

Example 3: Use Algebra Vocabulary

a. Find the conjugate of $-3 + x$.

Given is an expression with exactly two terms. Its conjugate is an expression with the same terms but the arithmetic operator in the middle of these terms is changed to the opposite one. That is, we will change the arithmetic operator from $+$ to $-$ to get

$-3 - x$

b. Find the conjugate of $2x - 3$.

Given is an algebraic expression with exactly two terms. Its conjugate is an expression with the same terms but the arithmetic operator in the middle of these terms is changed to the opposite one. That is, we will change the arithmetic operator from $-$ to $+$ to get

$2x + 3$

Example 4: Use Algebra Vocabulary

Simplify $4xy + 4 + x + 6xy + 3x + 9y + 6$.

Here "simplify" means to add and subtract. However, we can only add/subtract like terms. Let's give the individual like terms different colors.

$4xy + 4 + x + 6xy + 3x + 9y + 6$

Notice that we can combine xy-terms and x-terms by adding/subtracting their coefficients. We can also add/subtract constants.

That is, $(4 + 6)xy + (1 + 3)x + 9y + 4 + 6$

    NOTE: There is an implied coefficient of 1 in front of x!

which combines to $10xy + 4x + 9y + 10$.

Example 5: Use Algebra Vocabulary

Simplify $ab + 3ab + 9a - 3a + b + 11 - 9 + 6b$.

Here "simplify" means to add and subtract. However, we can only add/subtract like terms. Let's give the individual like terms different colors.

$ab + 3ab + 9a - 3a + b + 11 - 9 + 6b$

Notice that we can combine ab-terms, a-terms, and b-terms by combining their coefficients. We can also combine constants.

That is, $(1 + 3)ab + (9 - 3)a + (1 + 6)b + 11 - 9$

NOTE: There is an implied coefficient of 1 in front of ab and b!

which combines to $4ab + 6a + 7b + 2$.

Example 6: Use the Distributive Property

Simplify $-5(6k + 1)$.

We are going to use the *Distributive Property* to simplify.

$$-5(6k + 1) = -5(6k) + (-5)(1)$$
$$= -30k + (-5)$$
$$= -30k - 5$$

Remember, a negative number times a positive number results in a product that is negative!

Example 7: Use the Distributive Property

Simplify $-(3x + 1)$.

We are going to use the *Distributive Property* to simplify.

Please note that there is actually -1 in front of the parentheses! Remember, we usually do not write the coefficient of 1.

$$-(3x + 1) = (-1)(3x) + (-1)(1)$$
$$= -3x + (-1)$$
$$= -3x - 1$$

Remember, a negative number times a positive number results in a product that is negative!

Example 8: Use the Distributive Property

Simplify $-5(-6-9x+11y)$.

We are going to use the *Distributive Property*. Please note that now we have three terms in the parentheses. However, this will not be an issue.

According the the *Distributive Property*, we simply multiply the number on the outside of the parentheses with every term in the parentheses.

$$-5(-6-9x+11y) = -5(-6) + (-5)(-9x) + (-5)(11y)$$
$$= 30 + 45x + (-55y)$$
$$= 30 + 45x - 55y$$