Name: _____ Date: _____

PARTS OF AN ALGEBRAIC EXPRESSION
N-GEN MATH® 6

An **expression** is a combination of numbers using operations such as addition, subtraction, multiplication, division, and exponentiation. An **expression** that contains a **variable** is known as an **algebraic expression**.

***Exercise* #1:** Write an algebraic expression for each of the following using n to stand for the number that is not specified.

(a) 12 added to the number

(b) the number divided by 8

(c) three times the number

(d) one-half of the number

(e) the number squared

(f) the number cubed

***Exercise* #2:** Consider the expression $4x + 3y - 7$.

(a) Evaluate the expression for $x = 5$ and $y = 2$. Show the steps in your calculations.

(b) Which operations happened last and why?

It is time to introduce the idea of a **term** of an **expression**. In the above example, $4x$, $3y$, and 7 are all considered **terms** of this expression.

MATHEMATICAL TERM

A **term** is a **combination** of **numbers** and/or **variables** using multiplication, division, or exponentiation. They are separated in expressions by addition (+) and subtraction (-).

***Exercise* #3:** For each of the following algebraic expressions, circle each term and state how many terms each expression contains.

(a) $7x - 8$

(b) $4x^2 + 3y + 9$

(c) $2a + 5b - 3c + d - 12$

Algebraic terms, those with **variables in them**, can be examined more closely. We now introduce the concept of the **coefficient** of a term.

THE COEFFICIENT OF AN ALGEBRAIC TERM

For an algebraic term, the number that **multiplies the variable(s)** of the term is known as the **coefficient** of the term. For example, if the term is $5x^2$ then the coefficient is 5.

***Exercise* #4:** For each of the following expressions do the following: (1) circle each term, (2) write each term separately, and (3) state the coefficient of each term.

(a) $6x + 9y$ (b) $7x^2 + 12x$ (c) $5x + 2y + 3z$

In *Exercise* #4 it is "easy" to identify the coefficients of each term. Let's do some that are trickier. Remember that the coefficient is the number **multiplying** the variable.

***Exercise* #5:** For each of the following terms, rewrite it as a multiplication and identify the coefficient.

(a) x (b) $\frac{x}{2}$ (c) $\frac{x}{10}$ (d) $\frac{3x}{4}$

Coefficients often have real world meanings.

***Exercise* #6:** Kevin is keeping track of how much money he has saved up. He starts with a certain amount of money already saved and puts the same amount in his bank each week. He figures out that the expression $3n + 12$ will calculate the amount he has saved after n weeks.

(a) How much money will Kevin have saved after 1 week? After 2 weeks? After 3 weeks?

$n = 1$:

$n = 2$:

$n = 3$:

(b) What does the coefficient of 3 on the term $3n$ represent in the real world? What does the 12 represent?

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PARTS OF AN ALGEBRAIC EXPRESSION
N-GEN MATH® 6 HOMEWORK

FLUENCY

1. Convert each of the following into mathematical expressions where *n* represents the unknown number.

   (a) the sum of the number and 8

   (b) 10 subtracted from the number

   (c) five times the number

   (d) the number divided by four

   (e) the number subtracted from 25

   (f) 16 subtracted from twice the number

2. For each of the following expressions, circle each term and list how many there are. The first is done as an example for you.

   (a) $\textcircled{2x}+\textcircled{4y}+\textcircled{7}$

   3 terms

   (b) $6x - 2y$

   (c) $4x^2 + 2x - 3$

   (d) $\frac{1}{2}x + 5$

   (e) $3x - 2y - 5z + w$

   (f) $c^2 - a^2$

3. A number that multiplies a variable is called which of the following?

   (1) an expression (3) a term

   (2) a coefficient (4) an exponent

4. State the coefficient for each of the following terms.

(a) $4x$ (b) $\frac{3}{4}y$ (c) $10x^2$ (d) $\frac{c}{5}$

(e) x (f) $\frac{2n}{5}$ (g) $\frac{w}{3}$ (h) n

5. Which of the following is *not* a coefficient of the expression $5x + \frac{y}{3} + 7z + \frac{4w}{5}$?

(1) 5 (3) 3

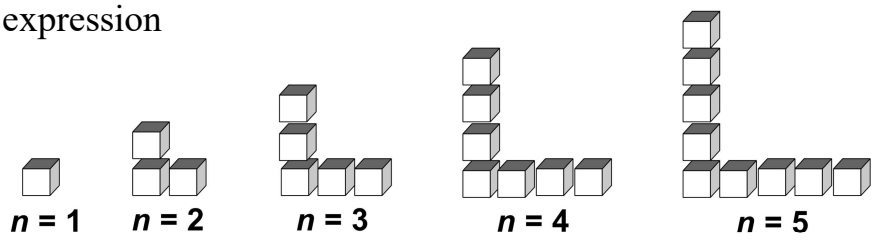
(2) $\frac{4}{5}$ (4) 7

USING YOUR MATH

6. A pattern using cubes is shown to the right. The number of cubes at a particular place in the pattern can be calculated using the expression

$$2n - 1$$

The **variable** n represents the place in the pattern.



(a) Verify that the formula works for $n = 3$ and $n = 5$. Show your calculations below.

(b) Why do you think the coefficient of the n is 2?

(c) Will there ever be an even number of cubes in a place in the pattern? Explain your thinking.