

Lab Grade 6 Algebraic Expressions Clarification

CCSSM: Grade 6

DOMAIN: Expressions and Equations

Cluster: Apply and extend previous understandings of arithmetic to algebraic expressions.

Standard: 6.EE.2 Write, read, and evaluate expressions in which letters stand for numbers.

- a. Write expressions that record operations with numbers and with letters standing for numbers.
- c. Evaluate expressions at specific values for their variables. Include expressions that arise from formulas in real-world problems.

Standard: 6.EE.3 Apply the properties of operations to generate equivalent expressions.

Standard: 6.EE.6 Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set.

Clarification of Math Discussion Terms

An **ALGEBRAIC EXPRESSION** contains arithmetic operations, numbers, and letters, called variables, which take the place of numbers. For instance: “ $5n + 3$ ”, “ $x - 7$ ”, “ $6x \div 3$ ”, “ $2n$ ” and “ x^3 ” are all algebraic expressions.

Evaluating an expression requires following the order of operations rules: remove parentheses; apply exponents; do the multiplications and divisions in the order in which they appear, and then do the additions and subtractions in the order in which they appear. Some authors suggest the acronym “PEMDAS” (Parentheses, Exponents, Multiplication, Division, Addition, Subtraction) to assist students in remembering the order. Others suggest the phrase, “Please Excuse My Dear Aunt Sally.” Critics of the PEMDAS method say that it does not sufficiently communicate to students that the $+ - \times \div$ must be completed in the order in which they appear.

Classroom Example 1

The number of hooves of an unknown number (x) of horses could be represented in what mathematical way?

Answer: $4x$

Classroom Example 2a

If there are 3 books in each student's desk, write an expression to represent the total number of books. Let n represent the number of student desks.

Answer: $3n$

Classroom Example 2b

Then, if there are 15 student desks, how many books would that be altogether?

Answer: $3 \times 15 = 45$

Classroom Example 3

If each student eats 5 cookies, write an expression to represent the number of cookies a teacher must buy to feed all of the students. Let s represent the number of students.

Answer: $5s$

The Math in the Puzzle

In The Lab puzzle, players may use algebraic expressions to represent the recipe ingredients that they must put into the vat using the smaller measuring jars. Players must determine the correct combination of measuring jars for each ingredient and may organize their thoughts by assigning variables to the measuring jars. It may be necessary to manipulate a portion of an ingredient from one jar to another, or from a jar into the waste pipe, which players will conceptualize as subtraction. Players should use subtraction cautiously, however, because the waste pipe will not tolerate excessive waste!



Suppose that the variable a represents the container labeled 16, and b represents the container labeled 7, and c represents the container labeled 4.

For example, to use an algebraic expression to fill the vat with 11 units of eyeballs, a player might write $b + c$. For the 9 units of carrots, the player might algebraically represent the amount as $a - b$. To fill the vat with the 2 units of flowers, a player might write $a - 2b$. A possible expression for filling the vat with 10 units of ladybugs might be $b + (b - c)$. Players would then evaluate the expression to determine the correct amounts of eyeballs, carrots, flowers, and ladybugs needed to follow the recipe.