Packet 5: Expressions and Equations 2

Dear Parents/Guardians,

In Packet 5, students continue the work from Packet 2 to simplify and evaluate expressions and solve equations. Students use cups and counters to model expressions and equations. While representing equations with cups and counters, students will use algebraic notation to write and justify steps.

Cups and Counters Expressions

A mathematical expression is a combination of numbers, variables, and operational symbols. Students will represent and evaluate expressions using the cups and counters model.

A "cup" represents an unknown value, such as x, and is represented by this picture:	An "upside-down cup" represents the opposite of an unknown value, such as -x, and is represented by this picture:
V	Λ
A number will be represented by either + or –, depending on its value. The number 5 would be represented as + + + + + The number (-2) would be represented as – –	

Students will use the cups and counters model to evaluate expressions.
Example: Evaluate 2(x + 3), for x = -1.

Expression	Picture	Evaluate for given values of x.
$2(x+3)$	V + + + V + + + You have 2 groups of $x+3$.	For $x=-1$, substitute (–) for each cup. V + + + V + + + ➡ – + + + – + + + ➡ + + + + $2(x+3) = 2(-1+3) = 2(2) = 4$

Cups and Counters Equations

Students will solve for the unknown (the "cup") in equations while recording their steps using algebraic notation and in words. The goal is to figure out what each cup holds (all cups must hold the same amount). Below is an example.

Picture	Equation/Steps	What did you do?
V V V V V + + + + V V – –	$5x+4 = 2x-2$	Build/Given
V V V V V + + + + V V – – – – –	$5x = 2x-6$	Add (-4) to both sides
V V V V V V V – – – – – –	$3x = -6$	Add (-2x) to both sides
V V V – – – – – –	$x = -2$	Divide by 3 to both sides
Check your solution using substitution: $5(-2)+4 = 2(-2)-2$ $-10+4 = -4-2$ $-6 = -6$		

By the end of the packet, your student should know…

How to simplify and evaluate expressions using properties of arithmetic Lessons 5.1 and 5.2

How to represent expressions and solve equations using the cups and counter model Lessons 5.1, 5.2 and 5.3

How to use algebraic notation to write and justify steps for solving algebraic equations Lesson 5.3

Additional Resources

Resource Guide (RG)
Part 1, pages 38-43