

What We Are Learning

Multi-Step Equations

Vocabulary

These are the math words we are learning:

Associative Property

when adding or multiplying, terms can be grouped in any combination without changing the result

coefficient the number that is multiplied by the variable in an algebraic expression

Commutative Property

when adding or multiplying, terms can be placed in any order without changing the result

constant a value that does not change

Distributive Property if you multiply a sum by a number, the result will be the same as if you multiply each term in the sum by the number before adding them

equivalent expressions expressions that have the same value for all the values of the variables

like terms terms that have the same variable raised to the same power

term elements of an expression that are separated by operations

Dear Family,

The student will learn the properties of rational numbers that will be used throughout the rest of the course. These include the Associative and Commutative Properties, which deal with how terms are grouped and ordered within addition and multiplication expressions, and the Distributive Property, which uses a combination of multiplication and addition.

The student will learn how to combine like terms in order to simplify an expression. Combining like terms is an important concept for the student to grasp. The student will learn that just because he or she changes the way an expression looks, the value of the expression stays the same. For example:

Combine like terms.

$$6x + 8y + 9x$$

$$6x + 9x + 8y$$

$$15x + 8y$$

Identify like terms.

Rearrange the expression.

Add the coefficients of like terms.

The student will also learn to solve equations where there is more than one variable term on the same side of an equation. The first step is to combine like terms so that there is only one variable term. Then solve for the variable using inverse operations.

$$\text{Solve. } 3k + 5 - k = -9$$

$$3k + 5 - k = -9$$

Combine "like terms."

$$3k - k = 2k$$

$$2k + 5 = -9$$

$$2k + 5 = -9$$

Now get the k alone.

$$\begin{array}{r} -5 \\ 2k + 5 = -9 \\ \hline 2k = -14 \end{array}$$

Subtract first.

$$2k = -14$$

$$\frac{2k}{2} = \frac{-14}{2}$$

Divide next.

$$k = -7$$

Family Letter**Section A** continued

Your child will also learn to solve equations with variables on both sides of the equal sign. The first goal is to get all of the variables on one side by using inverse operations. Then, the steps are the same as in the previous problems.

Solve. $6y - 5 = 3 + 4y$

$$\begin{array}{r} 6y - 5 = 3 + 4y \\ -4y \quad \quad -4y \\ \hline \end{array}$$

$$2y - 5 = 3$$

$$\begin{array}{r} 2y - 5 = 3 \\ + 5 \quad + 5 \\ \hline \end{array}$$

$$2y = 8$$

$$\frac{2y}{2} = \frac{8}{2}$$

$$y = 4$$

Get all y 's on one side by subtracting $4y$ from both sides.

Add 5 to both sides.

Divide both sides by 2.

It is important that the student learn to solve equations. He or she will use this skill in every math course he or she takes from this point forward. Reinforce these concepts by practicing regularly.

Sincerely,

What We Are Learning

Solving Inequalities

Vocabulary

These are the math words we are learning:

algebraic inequality an inequality that contains a variable

inequality a statement that two quantities are not equal, or may not be equal

solution set all of the solutions of an inequality

Dear Family,

In this section, the student will be introduced to the concept of inequality and will learn how to solve algebraic inequalities.

An inequality states that two values are not, or may not be, equal. Inequalities use four different symbols to show this:

Symbol	Meaning
$<$	is less than
$>$	is greater than
$\leq$	is less than or equal to
$\geq$	is greater than or equal to

Algebraic inequalities contain variables and are solved in much the same way as algebraic equations. In fact, when solving algebraic inequalities that use only addition or subtraction, the student will use the exact same steps as when solving algebraic equations. Instead of finding a single solution, though, the student will find a set of solutions.

Solve $x - 5 \leq 10$.

$$x - 5 \leq 10$$

$$\begin{array}{r} + 5 \\ x - 5 \leq 10 \\ \hline x \leq 15 \end{array}$$

Add 5 to both sides.

To check the answer, the student should choose a number from the solution set and substitute it for the variable in the original inequality.

$$x - 5 \leq 10$$

$$11 - 5 \stackrel{?}{\leq} 10 \quad 11 \leq 15$$

$$6 \leq 10 \quad \checkmark$$

The student will also learn how to show a solution set using a number line. An open circle means that the number is not part of the solution set, and a closed circle means that the number is part of the solution set.



$$x < 1$$



$$x \geq -2$$

Family Letter**Section B** continued

Solving algebraic inequalities that use multiplication and division uses the same steps as solving algebraic equations, with one exception. If the student multiplies or divides both sides of the inequality by a negative number, he or she must reverse the direction of the inequality, as demonstrated below.

$$\begin{aligned} -5 &< 3 \\ -2(-5) &\stackrel{?}{<} -2(3) \\ 10 &\stackrel{?}{<} -6 \star \\ 10 &> -6 \checkmark \end{aligned}$$

Finally in this section, the student will learn to solve two-step algebraic inequalities. As with two-step equations, the student will first use inverse operations to isolate the term containing the variable, and then will use inverse operations to isolate the variable.

Solve $-2x - 4 \geq 28$

$$\begin{aligned} -2x - 4 &\geq 28 \\ -2x &\stackrel{+4}{\geq} \stackrel{+4}{32} \\ \frac{-2x}{-2} &\leq \frac{32}{-2} \\ x &\leq -16 \end{aligned}$$

Add 4 to both sides.

Divide both sides by -2 and reverse the inequality.

Check:

$$\begin{aligned} -2x - 4 &\geq 28 \\ -2(-20) - 4 &\stackrel{?}{\geq} 28 \\ 40 - 4 &\stackrel{?}{\geq} 28 \\ 36 &\geq 28 \checkmark \end{aligned}$$

Substitute -20 for x since $-20 \leq -16$.

Sincerely,