CHAPTER 11

Family Letter

Section A

What We Are Learning

Multi-Step Equations

Vocabulary

These are the math words we are learning:

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

term a number, a variable, or a product of numbers and variables in an algebraic expression

Dear Family,

In this section, the student will be learning to solve equations that have more than one operation.

The easiest equations to solve are those that have only one variable term. The student will learn to solve these types of equations by performing inverse (opposite) operations on each of the numbers that are on the same side as the variable.

Solve. $-4x + 8 = 16$

$-4x + 8 = 16$ — Subtract first to get the x by itself.

$\underline{-8} \quad \underline{-8}$

$-4x = 8$

$\frac{-4x}{-4} = \frac{8}{-4}$ — Divide each side by -4.

$x = -2$

Check your answer by substituting -2 for x.

$-4(-2) + 8 = 8 + 8 = 16$ The answer checks.

The student will also learn to solve equations that have more than one variable on the same side. First, he or she will combine like terms. Then he or she will solve for the variable using inverse operations.

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

$3k + 5 - k = -9$ — Combine "like terms." $3k - k = 2k$

$2k + 5 = -9$

$2k + 5 = -9$

$\underline{-5} \quad \underline{-5}$ — Subtract 5 from both sides.

$2k = -14$

$\frac{2k}{2} = \frac{-14}{2}$ — Divide both sides by 2.

$k = -7$

The student will also learn to solve equations with variables on both sides of the equal sign. The first goal is to get all the variables on one side by using inverse operations. Then, solve for the variable.

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

$6y - 5 = 3 + 4y$
$\underline{-4y} \quad\quad \underline{-4y}$ — Get all the y's on one side by subtracting $4y$ from both sides.
$2y - 5 = 3$

$2y - 5 = 3$
$\underline{+5} \quad \underline{+5}$ — Add 5 to both sides.
$2y = 8$

$\frac{2y}{2} = \frac{8}{2}$ — Divide both sides by 2.
$y = 4$

When deciding which variable terms to add or subtract, it is helpful to choose the ones that will give a positive result.

Solve. $3m + 21 = 5 + 11m$

If you subtract $11m$ from both sides, you will have $-8m$ on the left. Instead, subtract $3m$ from both sides.

$3m + 21 = 5 + 11m$
$\underline{-3m} \quad \underline{-3m}$

$21 = 5 + 8m$ — Subtract 5 from both sides.
$\underline{-5} \quad \underline{-5}$
$16 = 8m$

$\frac{16}{8} = \frac{8m}{8}$ — Divide both sides by 8.
$2 = m$ — $2 = m$ is the same as $m = 2$.

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

Sincerely,

CHAPTER 11

Family Letter

Section B

What We Are Learning

Inequalities

Vocabulary

These are the math words we are learning:

algebraic inequality an inequality containing a variable

compound inequality a combination of more than one inequality

inequality a statement that shows the relationship between quantities that are not equivalent

solution set the set of values that make a statement true

Dear Family,

In this section, the student will be learning what it means for a number to be a solution to an inequality. He or she will learn to solve inequalities by isolating the variable and finding its value.

The student will learn the meaning of the inequality symbols and the phrases that go along with them. There are four symbols that he or she should be familiar with: $<$, $>$, $\geq$, $\leq$.

Write an inequality for each situation.

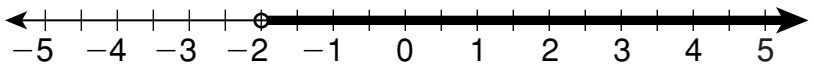
A. There were fewer than 1,000 people at the concert.
"Fewer than" corresponds to the symbol $<$, so the inequality is "number of people $<$ 1,000."

B. You can invite no more than 5 friends to go to lunch.
"No more than" corresponds to the symbol $\leq$, so the inequality is "friends $\leq$ 5."

The student will also learn how to graph inequalities on a number line by shading appropriately.

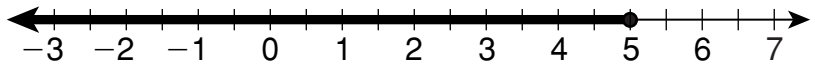
Graph each inequality.

A. $x > -2$



Open circles are used when the inequality symbol is $<$ or $>$.

B. $n \leq 5$



Closed circles are used when the inequality symbol is $\leq$ or $\geq$.

The student will learn to find solution sets of inequalities using the same methods he or she used to find solutions to equations, by isolating the variable.

As with equations, the student will follow the order of operations in reverse when isolating the variable (*subtraction and addition first, division and multiplication next*).

Solve. Then graph each solution set on a number line.

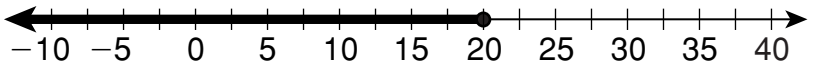
$\frac{x}{4} + 7 \leq 12$

$-7 \quad -7$ First, subtract 7 from both sides.

$\frac{x}{4} \leq 5$

$(4)\frac{x}{4} \leq 5(4)$ Next, multiply both sides by 4.

$x \leq 20$



If a step in solving the inequality involves multiplying or dividing by a negative number, reverse the inequality symbol.

Solve. Then graph each solution set on a number line.

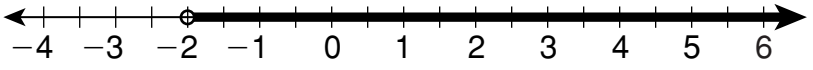
$11 - 6x < 23$

$-11 \quad -11$ First, subtract 11 from both sides.

$-6x < 12$

$\frac{-6x}{-6} > \frac{12}{-6}$ Next, divide both sides by −6 and reverse the inequality symbol.

$x > -2$



Reinforce with the student how to find solution sets to inequalities by practicing the steps learned in this lesson.

Sincerely,