Two-Variable Inequality and Equation Word Problems

In this lesson, you will get practice on analyzing word problems to write inequalities or equations based on the information given.

Even though this class is not reading, word problems are a BIG part of Algebra 1, so make sure to pay extra attention to this lesson!

Equation Word Problems:

Dave's Food Shop sold 30 more hamburgers than hot dogs on Monday. His store made $890 with a hot dog being $5 and a hamburger being $8. How many hamburgers and hot dogs did Dave sell on Monday?

The first step is to assign variables to hot dogs (x) and hamburgers (y).

Then translate the first sentence of the question into $y = x + 30$ to signify there were 30 more hamburgers sold compared to hot dogs.

Finally, translate the second sentence of the question into $5x + 8y = 890$ to show the prices and total money Dave received on Monday.

$$y = x + 30$$

$$5x + 8y = 890$$

Now that we have our 2 equations, use substitution to find out what x and y are.

$$5x + 8(x + 30) = 890$$

$$5x + 8x + 240 = 890$$

$$13x + 240 = 890$$

$$13x = 650$$

$$x = 50$$

$$y = 50+30$$

$$y = 80$$

A hot dog costed $50 and a hamburger costed $80.

Inequality Word Problems:

Beth wants to make MORE THAN $120 by selling toys for $5 and treats for $3. She also wants to sell AT LEAST 12 toys and treats combined. Write 2 inequalities that satisfy the conditions of this question.

First, follow the steps that we did for equations. Assign variables to toys (x) and treats (y).

Translate the first sentence of the question. Toys cost $5 (5x) and treat cost $3 (3y) and Beth wants to make MORE THAN (>) $120.

Inequality Sign Translations to Words:

> - MORE THAN

< - LESS THAN

≤ - NO MORE THAN

≥ - AT LEAST

Translate the second sentence of the question. Beth wants to sell AT LEAST (≥) 13 toys and treats combined (x + y).

Now that we have translated both conditions into inequalities, write them out to satisfy the question.

$$5x + 3y > 120$$

$$x + y \geq 13$$

Being able to translate from words to numbers is super important when it comes to understanding word problems! Make sure to keep practicing!

Tips for Solving Problems:

1. Translating words into numbers is a very important skill that will help you not just in Algebra 1! Make sure you understand the inequality sign wording and words that ask you to add variables (combine) or attach numbers to them (like price of items).

2. If you need to solve for the variables you set up when translating words into equations (like the first example in this lesson), make sure to follow the methods for Systems of Equations (Check out that lesson if you have difficulty with it!).

3. When reading word problems, focus especially on any numbers in the problem! Sentences with numbers usually help you determine what equations/inequalities you are writing when looking at the sentences of the problem.