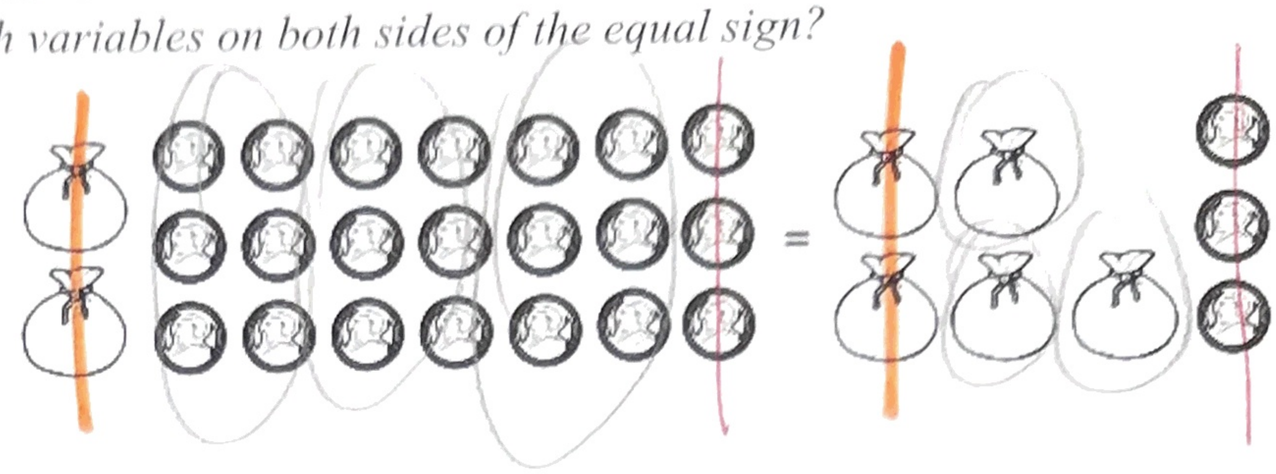
Name: _____ Date: Sept 10 Hour: ___Alg 1____

Unit 1B Day 15: Variables on Both Sides

Focus Question: How do I solve an equation with variables on both sides of the equal sign?

A. From a Picture to Symbols

1. How many coins are in each pouch?



2. What does the problem above look like when it is done algebraically?

b is for # of coins in a bag

$3b+21=5b+3$

$-2b \quad -2b$

$21=3b+3$

$-3 \quad -3$

$18=3b$

$\frac{3}{} \quad \frac{3}{}$

$6=b$

An equation is solved when a variable is isolated on <u>one side of the equal sign</u>. In order for this to happen, <u>the variable can only be on one side</u>. **You must decide which side is going to be the variable side before you can continue solving! You are strongly encouraged to label your choice.**

B. Solve each equation below and then check your solution when told.

1. $5n+12=9n-16$ ★

$-5n \quad -5n$

$12=4n-16$

$+16 \quad +16$

$28=4n$

$\frac{4}{} \quad \frac{4}{}$

$7=n$

Check: (Substitute)

$5(7)+12=9(7)-16$

$35+12=63-16$

$47=47$

True so $n=7$ is correct

2. $\frac{4}{5}=\frac{x-7}{x+2}$

$4(x+2)=5(x-7)$

$4(x)+4(2)=5(x)+5(-7)$

$4x+8=5x-35$ ★

$-4x \quad -4x$

$8=x-35$

$+35 \quad +35$

$43=x$

Check:

$\frac{4}{5}=\frac{43-7}{43+2}$

$\frac{4}{5}=\frac{36\div 9}{45\div 9}$

$\frac{4}{5}=\frac{4}{5}$

True so $x=43$ is correct

3. $2(2x + 6) = 2x - 12$

4. $\frac{c+20}{-9} = \frac{c-4}{5}$

$5(c+20) = -9(c-4)$

$5(c)+5(20) = -9(c)-9(-4)$

$5c + 100 = -9c + 36$

$+9c \qquad +9c$

$14c + 100 = 36$

$-100 \quad -100$

$\frac{14c}{14} = \frac{-64}{14}$ ÷2 ÷2

$c = \frac{-32}{7}$

5. $5n = 3n - 8$

6. $\frac{x}{4} + 6 = 3x + \frac{1}{2}$

Check:

Chelsea's test had the problem 4(2x – 10) = 6x + 20. Her work is below. Explain her error(s) in reasoning.

$$4(2x - 10) = 6x + 20$$
$$4(2x) + 4(-10) = 6x + 20$$
$$8x - 40 = 6x + 20$$
$$+6x \qquad -6x$$
$$14x - 40 = 20$$
$$+40 \qquad +40$$
$$\frac{14x}{14} = \frac{60}{14}$$
$$x = \frac{30}{7}$$