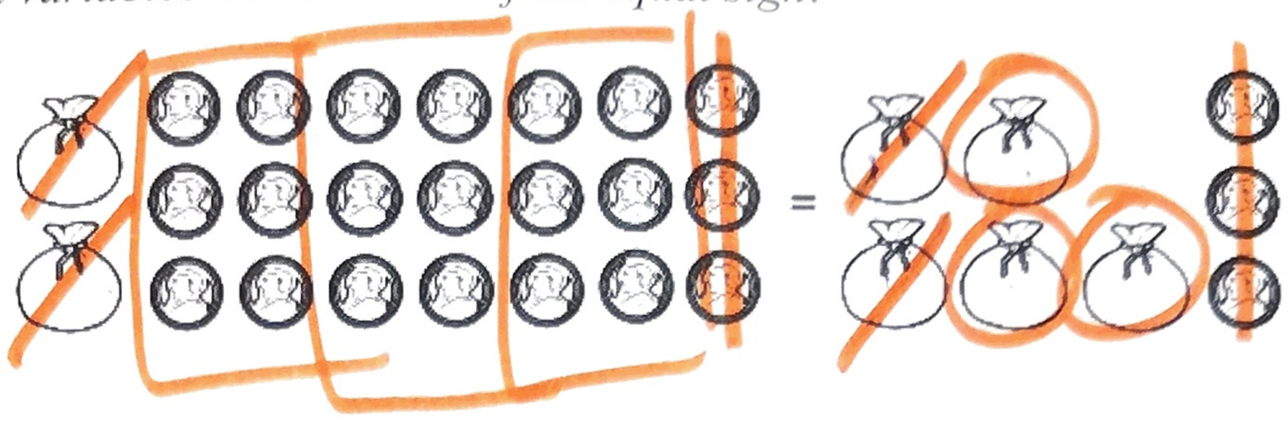
Name: _____ Date: Sept 4 Hour: 2nd

Unit 1 Day 12: 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?

c is # of coins in a bag

$2c + 21 = 5c + 3$

$-2c \quad\quad -2c$

$21 = 3c + 3$

$-3 \quad\quad -3$

$\frac{18}{3} = \frac{3c}{3}$

$6 = c$

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

1. $5n + 12 = 9n - 16$

$-9n \quad\quad -9n$

$-4n + 12 = -16$

$-12 \quad\quad -12$

$\frac{-4n}{-4} = \frac{-28}{-4}$

$n = 7$

Check: (substitute)

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

$47 = 47$

True so $n = 7$ is right

2. $-7x + 15 = -3 + 2x$

$-2x \quad\quad -2x$

$-9x + 15 = -3$

$-15 \quad\quad -15$

$\frac{-9x}{-9} = \frac{-18}{-9}$

$x = 2$

Check:

$-7(2) + 15 = -3 + 2(2)$

$1 = 1$

True so $x = 2$ is right.

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

$2\cdot 2x + 2\cdot 6$

$4x + 12 = 2x - 12$

$-4x \quad -4x$

$12 = -2x + 12$

$+12 \quad +12$

$24 = -2x$

$-2 \quad -2$

$-12 = x$

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

$-9\cdot c - 9\cdot -4 = 5\cdot c + 5\cdot 20$

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

$+9c \quad +9c$

$36 = 14c + 100$

$-100 \quad -100$

$-64 \div 2 = 14c$

$14 \div 2 \quad 14$

$-4.571428 = c$ for now

$\frac{-31}{7}$ high school

Practice Rally Coach

A. $5n = 3n - 8$

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

Check:

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

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

Chelsea had to solve $4(2x-10) = 6x+20$. Her answer was $x = 30/7$. But she is wrong bc she didn't do the same operation on both sides.

At $8x - 40 = 6x + 20$ she should...

$-6x \quad -6x$

$2x - 40 = 20$

$+40 \quad +40$

$\frac{2x}{2} = \frac{60}{2}$

$x = 30$