Name: _____ Date: __Dec 16__ Hour: __Alg 1__

Unit 4 Day 12: Solving a system using elimination day 2

Focus Question: How do I make variables eliminate each other if the coefficients aren't already the same?

subtract ↑   add ↑

A. Elimination works easily when the coefficients are the same (or opposites). **Sometimes the coefficients are not set up to automatically eliminate each other so you must get them to be opposites.** To do this, you can multiply the entire equation by the same factor.
Perform each distribution below.

1. $3(x + 2y) = 4(3)$

$3x + 6y = 12$

2. $-5(4x + 7y) = -3(-5)$

$-5(4x + 7y = -3)$

$-20x - 35y = 15$

B. Solve each system below.

1. Solve $-2(3x + y) = (-10)(-2) \rightarrow -6x - 2y = +20$ Solution $(-7, 11)$

$-4x - 2y = 6$ justcopy

$\begin{array}{l} -6x - 2y = 20 \\ -4x - 2y = 6 \\ \hline -2x = 14 \\ \overline{-2} \quad \overline{-2} \\ x = -7 \end{array}$

$-4(-7) - 2y = 6$ ✓
$28 - 2y = 6$
$-28 \qquad -28$
$\overline{ }$
$\dfrac{-2y}{-2} = \dfrac{-22}{-2}$
$y = 11$

2. Solve $6x + 5y = 6$ copy→ $6x + 5y = 6$ Solution $(1, 0)$

$3(2x - y) = (2)3 \rightarrow 6x - 3y = 6$

$\begin{array}{l} 6x + 5y = 6 \\ 6x - 3y = 6 \\ \hline \dfrac{8y}{8} = \dfrac{0}{8} \\ y = 0 \end{array}$

$\dfrac{2x - 0 = 2}{2} \quad \dfrac{}{2}$
$x = 1$

C. Sometimes you must find a common multiple of the coefficients to make them eliminate each other. (While the LEAST common multiple will allow you to work with smaller numbers, ANY common multiple will work!) Give a common multiple of each pair of numbers below.

1. 6 and 4

12 LCM

24 CM

2. 3 and 5

15

3. 8 and 12

24 LCM

D. Solve each system below.

1. Solve $\begin{cases} 3(2x - 2y) = 4 \cdot 3 \\ 2(3x + 5y) = 10 \cdot 2 \end{cases}$ → $-6x - 6y = 12$
   → $6x + 10y = 20$

$-16y = \dfrac{-8}{-16} \quad \dfrac{-8}{-16}$

$y = \dfrac{1}{2}$

$2x - 2\left(\dfrac{1}{2}\right) = 4$

$2x - 1 = 4$

$\dfrac{+1 \quad +1}{\dfrac{2x}{2} = \dfrac{5}{2}} \quad x = \dfrac{5}{2}$

Solution $\left(\dfrac{5}{2}, \dfrac{1}{2}\right)$

2. Solve $\begin{cases} 3(4x + 2y) = 10 \cdot 3 \\ 2(6x - 3y) = 14 \cdot 2 \end{cases}$ → $12x + 6y = 30$
   → $12x - 6y = 28$

$\dfrac{24x}{24} = \dfrac{58}{24}$

$x = \dfrac{29}{12}$

$12x + 6y = 30$
$12x - 6y = 28$

$\dfrac{12y}{12} = \dfrac{2}{12}$

$y = \dfrac{1}{6}$

Solution $\left(\dfrac{29}{12}, \dfrac{1}{6}\right)$

E. Word Problems: Remember to identify your variables.

1. At their last game, the basketball team sold sodas and waters which made a total of $151. They sold a total of 58 drinks. If they charged $2 for each water and $3 for each soda, how many of each drink was sold?

2. The perimeter of the rectangle is 34 cm. The perimeter of the triangle is 30 cm. Find the values for *m* and n.

Sum of the sides

[rectangle with sides m and $2n$]   [triangle with sides $5m$, $2n+1$, n]
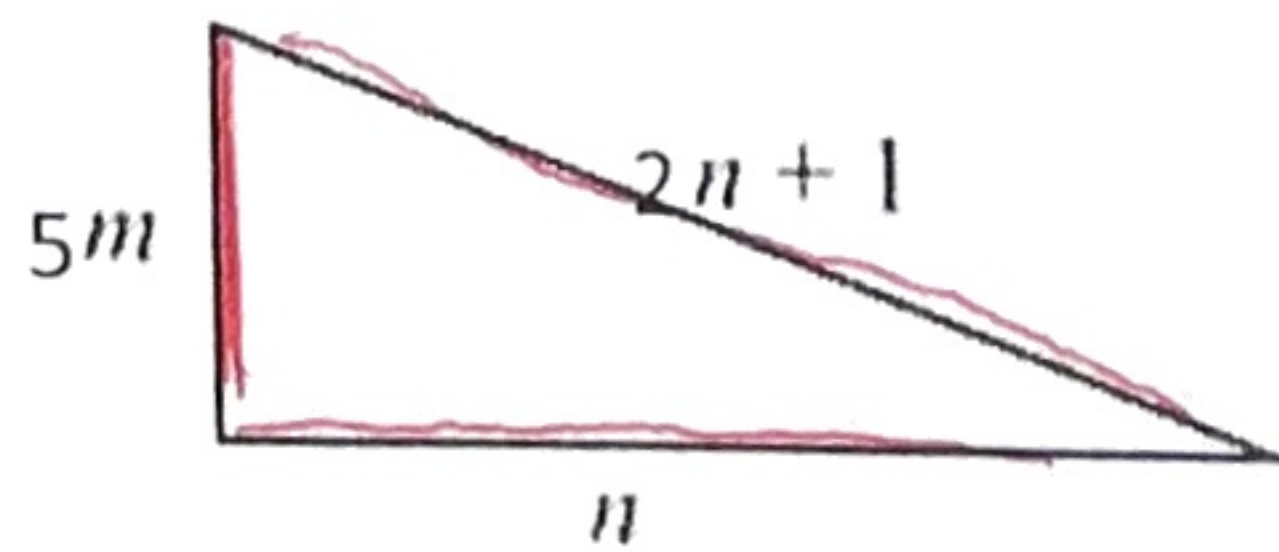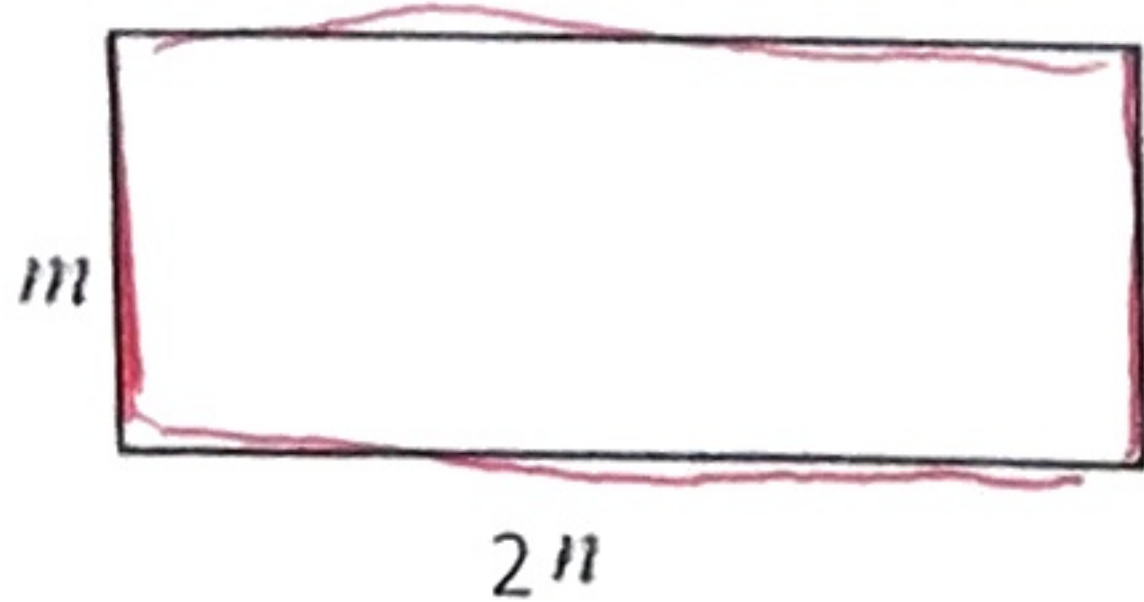
$m + 2n + m + 2n = 34$

$3(2m + 4n) = (34)3$

$5m + n + 2n + 1 = 30$

$4(5m + 3n) = (29)4$

$6m + 12n = 102$
$20m + 12n = 116$

$\dfrac{-14m}{-14} = \dfrac{-14}{-14}$

$m = 1$

$2(1) + 4n = 34$

$\dfrac{-2 \qquad -2}{\dfrac{4n}{4} = \dfrac{32}{4}} \quad n = 8$