"Teacher"

Name _____ Pd 1/2 Date February 13 Section 6.7

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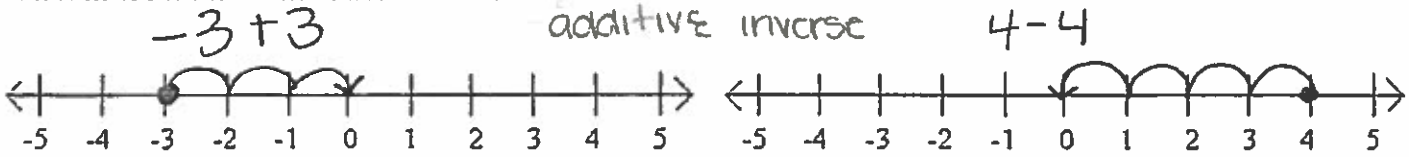
Solving Systems Algebraically by ELIMINATION

Recall:

The GOAL of elimination is to Cancel out one variable so that we can Solve for the other.

What must we have in order to do this?



So how can we make this happen? manipulate the equation to get additive inverses

Steps	Example	Observations - What do you see? What action was taken in order to see what you see?	Why? - What is the significance of your observation? (and/or) Why is the mathematician allowed to do so?
1	$-2x + 15y = -32$ $7x - 5y = 17$	(2) Standard Form equations	don't see anything that cancels out
2	$-2x + 15y = -32$ $3(7x - 5y) = (17)3$	they multiplied the 2nd eq by (3)	multiplying (3) by the 2nd eq is because whatever you do to one side you do to the other
3	$-2x + 15y = -32$ $21x - 15y = 51$	they distribute	the $15y + (-15y)$ will cancel out
4	$-2x + 15y = -32$ $\underline{21x - 15y = 51}$ $19x + 0y = 19$	added both eqns together, combining together.	now we only have (x) in our new equations
5	$\frac{19x}{19} = \frac{19}{19}$ $x = 1$	they divided	we have the (x) in our ordered pair
6	$-2x + 15y = -32$ $-2(1) + 15y = -32$	Plug in for (x)	the x-value will be 1 in both equations at the solution
7	$-2(1) + 15y = -32$ $-2 + 15y = -32$ $\underline{+2 \quad = +2}$ $\frac{15y}{15} = \frac{-30}{15}$ $y = -2$ Solution: $(1, -2)$	solve for (y) (inverse opp) write answer (x, y)	now we only have (y) for our ordered pairs

Let's Try It!

Steps	Example	Anticipate - Your Own Words	"Formal" Steps
1	$3x - 3y = 6$ $6x + 4y = 42$	3 + 6 are the factor multiple pair	Identify which coefficient pair is a factor/multiple pair.
2	$-2(3x - 3y) = 6(-2)$ $6x + 4y = 42$	multiply top equation by (-2)	Multiply the smaller coefficient by the factor that will make the coefficients additive inverses.
3	$6x + 6y = -12$	distribute.	Distribute this multiplying factor to BOTH sides of the equation.
4	$-6x + 6y = -12$ $6x + 4y = 42$ $0x + 10y = 30$	added both eqns together	Add the equations in order to eliminate one variable.
5	$\frac{10y}{10} = \frac{30}{10}$ $y = 3$	Then divide	Solve for the variable you still have.
6	$3x - 3y = 6$ $3x - 3(3) = 6$	Then plug in for (y)	Substitute the value for the variable you isolated back into one of the original equations. (Does it matter which equation?)
7	$3x - 3(3) = 6$ $3x - 9 = 6$ $+9 \quad +9$ $\frac{3x}{3} = \frac{15}{3}$ $x = 5$	solve for (x) (inverse opp) $(\frac{x}{5}, \frac{y}{3})$	Solve this equation for the remaining variable. Write the solution as an ordered pair.

<u>Practice multiplying by a factor that will allow elimination.</u>

1) $2x + 3y = 9$

$(-2)(1x + 5y = 8)(-2)$

$-2x - 10y = -16$

2) $-2x - 9y = -25$

$-4x - 9y = -23$

- multiply top by -2
- multiply top by -1
- multiply bottom by -1

3) $3(-3x + 7y) = (-16) \cdot 3$

$-9x + 5y = 16$

$9x - 21y = 48$

Remember, you are multiplying so coefficients of the same variable become <u>additive inverses</u>!