Name: Key Date: _____ Block: _____

9.2 Solving Linear Systems by Elimination

Bell Work

For what values of the coefficients *a* and *b* is the ordered pair (3, -3) the solution to the linear system below?

$ax + by = -15$

$2ax - 3by = 0$

Sub in the common point of (3, -3)

$a(3) + b(-3) = -15$ $\quad 2a(3) - 3b(-3) = 0$

$3a - 3b = -15$ $\quad 6a + 9b = 0$

Use substitution to solve.

Vocabulary

- Elimination method: add or subtract the equations to eliminate one variable and solve for the other variable.

Story Problem: The sum of two numbers is -22. The difference of the two numbers is 8. What are the two numbers?

LET STATEMENTS	SYSTEM
let a rep. one number let b rep. the other number	$a + b = -22$ $a - b = 8$

You would add instead of subtract to cancel out "b"!

$$\begin{array}{r} a+b=-22 \\ +\ a-b=8 \\ \hline 2a=-14 \end{array}$$

$a = -7, \ b = -29$

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∴ The 2 numbers are -7, -29.

Example 1: Solve the following linear system of equations using elimination. Verify your answer.

$2x + y = -7$

$x + y = -4$

Subtract the 2 equations to eliminate y.

$$\begin{array}{r} 2x+y=-7 \\ x+y=-4 \\ \hline x=-3 \end{array}$$

$x = -3$

$y = -1$

LS	RS
$2x+y$	-7
$2(-3)+(-1)$	
$-6-1$	
-7	LS = RS ✓

Example 2: Solve the following linear system of equations using elimination. Verify your answer.

$(2x + 7y = 24) \times 3$

$(3x - 2y = -4) \times 2$

$6x + 21y = 72$

$-6x - 4y = -8$

$25y = 80$

$y = 3.2 \quad x = 0.8$

$y = 3\frac{1}{5} \quad x = \frac{4}{5}$

LS	RS
$2x + 7y$	24
$2(\frac{4}{5}) + 7(\frac{16}{5})$	
24	

LS = RS ✓

You try!

Story Problem: The sum of two numbers is 175 and their difference is 1. What are the two numbers?

LET STATEMENTS	SYSTEM
let x rep one number let y rep the other number	$x + y = 175$ $x - y = 1$

add the equations to eliminate y.

$x + y = 175$

$+ \quad x - y = 1$

$2x = 176$

$x = 88$

$y = 87$

SENTENCE

∴ The 2 numbers are 88 and 87.

HW: P. 488 # 1, 2, 4, & 5 (pick 1), 7, 8, 9, 10, 11, 13