

**Objective: Solving Systems with Elimination****Homework SY4 – The Doctor’s Solving Systems with Elimination Handout****Do Now: Use substitution to solve the system.**

1. $y = 5x - 1$
 $y = 2x + 17$

2. $10y + 20 = x$
 $2y + x = 68$

State Test Prep: What is left over after you subtract $(3x + 5)$ from $(10x + 20)$?

A) $13x + 25$

B) $-7x - 15$

C) $7x - 15$

D) $7x + 15$

***A very special message from The Doctor...***

The last method of solving systems is elimination. It is powerful and easy to understand, but challenging to do.

After the lesson, let's discuss which method you prefer.

Solving Systems by Elimination

You can use addition, subtraction, and multiplication to eliminate a variable in a system. You “eliminate” a variable by using coefficients that are the same or opposites to cancel each other.

Addition Example	
$5x - 6y = -32$	Original
$3x + 6y = 48$	System
$5x - 6y = -32$	
$3x + 6y = 48$	Add the equations
$\underline{8x + 0 = 16}$	
$8 \qquad \qquad 8$	
$x = 2$	Solve for x
$3x + 6y = 48$	Pick an equation
$3(2) + 6y = 48$	Substitute 2 for x
$6 + 6y = 48$	
$6y = 42$	
$y = 7$	Solution: (2, 7)

Subtraction Example	
$a + s = 292$	Original
$3a + s = 470$	System
$a + s = 292$	
$3a + s = 470$	Subtract equations
$\underline{-2a + 0 = -178}$	
$-2 \qquad \qquad -2$	
$a = 89$	Solve for a
$a + s = 292$	Pick an equation
$89 + s = 292$	Substitute 89 for a
$s = 203$	
	Solution: (89, 203)

Practice: Addition and Subtraction

1. $5x - 6y = -32$ $3x + 6y = 48$	2. $3x + y = 4$ $2x - y = 6$	3. $2x - 3y = 10$ $2x + y = -6$	4. $2x + 18y = -9$ $4x + 18y = -27$
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Multiplication Example

The given system.	Prepare for elimination by multiplying the first equation by 5.	Subtract the equations to eliminate x.	
$2x + 5y = -22$	$\rightarrow 5(2x + 5y) = 5(-22)$	$\rightarrow 10x + 25y = -110$	
$10x + 3y = 22$	$\rightarrow 10x + 3y = 22$	$\rightarrow 10x + 3y = 22$	
		$0 + 22y = -132$	
Projected Solution: (4, -6)		$y = -6$	
Practice	$-2x + 15y = -32$ $7x - 5y = 17$	$x + y = 205$ $4x + 10y = 1084$	$20x + 3y = 20$ $-20x + 5y = 60$

Practice: Multiplication

<p>1. $-2x + 15y = -32$ $7x - 5y = 17$</p>	<p>2. $x + y = 205$ $4x + 10y = 1084$</p>	<p>3. $2x + 3y = 6$ $5x + 6y = 3$</p>
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Practice: Mixed Extra Practice!

1. $3x + 5y = 0$
 $-5x - 6y = 14$

2. $24x + 2y = 2$
 $6x - 3y = -3$

3. $2x + 4y = -100$
 $10x - 4y = -44$

Practice: Extra Mixed Extra Practice!

4. $20x + 3y = 20$
 $-20x + 5y = 60$

5. $15x + 10y = 20$
 $15x - 4y = 4$

6. $2x + 5y = -2$
 $10x + 3y = 12$