Lesson 7.4 – Solving a Linear System Using Elimination

Specific Outcome: 9.1 – Model a situation, using a system of linear equations. 9.2 – Relate a system of linear equations to the context of a problem. 9.5 – Determine and verify the solution of a system of linear equations algebraically. 9.7 – Explain a strategy to solve a system of linear equations. 9.8 – Solve a problem that involves a system of linear equations.

Elimination is the process of making *one variable* have the *same coefficient* in both equations so that they can be eliminated by adding or subtracting the two equations.

Solve: $x + y = -4$
$2x + y = -7$

We can see that the coefficient of the *y*-variables are both +1. Since they are *both positive*, we can *subtract* the equations so that the *y*- variable is eliminated:

Solve: $x + y = 10$
$2x - y = 14$

We can see that the y-coefficients are both 1 but have *opposite signs*. We can eliminate this variable by *adding* the equations.

Practice: Use eliminated to solve each of the following linear systems.

a) $x + y = 10$
$x - y = 6$

b) $2x + 7y = 13$
$3x - 7y = 2$

c) $2x + 6y = 6$
$2x + 3y = 4.5$

d) $2x + 3y = 18$
$6x - 5y = -2$

e) $3x - 4y = 7$
$5x - 6y = 8$

f) $5x + 3y = 3$
$3x - 7y = 81$

Problem Solving: Show all the work. Verify.

1. At Lisa's Sandwich Shop, two chicken sandwiches and four tuna sandwiches cost $18. Five chicken sandwiches and six tuna sandwiches cost $34. Find the cost of each sandwich. Use elimination to solve.

2. Five pencils and four pens cost $6.15. Three pencils and eight pens cost $9.85. Determine the cost for one pencil and one pen using elimination.

3. When b is eliminated from the equations $2x + b = 8$ and $5x + 2b = 2$, we obtain

   A. $7x = 10$
   B. $9x = 18$
   C. $x = -14$
   D. $3x = -6$

4. If $x + 2y = 7$ and $3x - y = 7$, then the value of $2x + y$ is _____.

**5. Use elimination to solve this system: $\frac{2}{3}x - \frac{1}{2}y = 4$
$\frac{1}{2}x + \frac{1}{4}y = \frac{5}{2}$

HOMEWORK: P. 437 – 3, 5, 6, 7, 8, 9, 10, 11, 16

EXTRA PRACTICE WORKSHEET:

Solve each system of equations below by the elimination method. Find the solution in the coordinate system and notice the letter at that point. Print this letter in each box at the bottom of the next page that contains the number of that exercise.

What do you call it when someone pays back a loan quickly?

1. $\begin{matrix} x+y=5 \\ 3x-y=7 \end{matrix}$

2. $\begin{matrix} 2x+y=3 \\ -2x+5y=-9 \end{matrix}$

3. $\begin{matrix} 3x+5y=0 \\ 2x-5y=-25 \end{matrix}$

4. $\begin{matrix} -4x-y=-6 \\ 4x+3y=18 \end{matrix}$

5. $\begin{matrix} 2x-y=-5 \\ -2x-5y=11 \end{matrix}$

6. $\begin{matrix} 4x-3y=8 \\ x+3y=17 \end{matrix}$

7. $\begin{matrix} -6=3x+y \\ 10+5x=-y \end{matrix}$

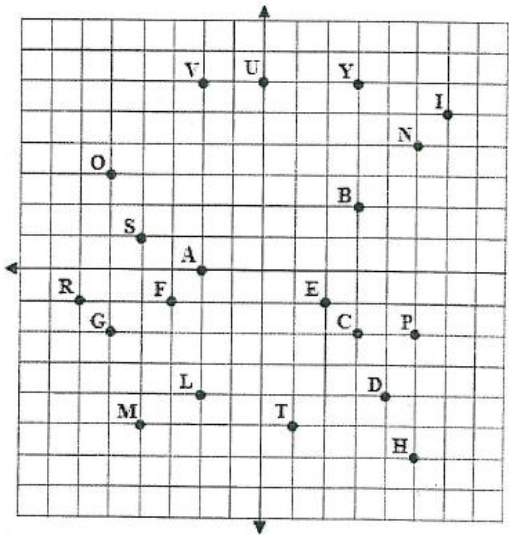
8. $\begin{matrix} 3x+8y=-1 \\ 3x-y=17 \end{matrix}$

9. $\begin{matrix} 3x-4y=-15 \\ x+6y=39 \end{matrix}$

10. $\begin{matrix} -2x+5y=-27 \\ 4x+9y=-41 \end{matrix}$

11. $\begin{matrix} 3x+4y=-8 \\ 2x-3y=-11 \end{matrix}$

12. $\begin{matrix} 6x+7y=-4 \\ 5x+3y=8 \end{matrix}$



7	11	4	12	12	2	6	12	2	1	10	8	7	9	3	5	5