(A) Lesson Context

BIG PICTURE of this UNIT:	• mastery with algebraic manipulations/calculations involving linear systems • proficiency in working with graphic and numeric representations of linear systems • proficiency in working with linear systems in real world scenarios		
CONTEXT of this LESSON:	Where we've been In Lesson 7, we reviewed graphic methods for solving linear systems	Where we are Consolidating skills in solving a linear systems algebraically	Where we are heading Mastery of solving & applying linear systems

(B) Lesson Objectives:

a. Consolidate skills involved when solving linear systems using the substitution & elimination methods.
b. Solve word problems modelled by linear systems using algebraic methods

(C) Skill Consolidation – FAST FIVE

a. Isolate the *y* term in the following equations:

(i) $2x - y = 7$ (ii) $3x + y = 12$ (iii) $3x - 2y = 6$ (iv) $5x + \frac{1}{2}y - 2 = 0$

b. Isolate the *x* term in the following equations:

(i) $x - 5y = 7$ (ii) $-3x + y = 12$ (iii) $5x - 2y = 6$ (iv) $0.25x + y - 2 = 0$

c. Simplify and solve the following expressions

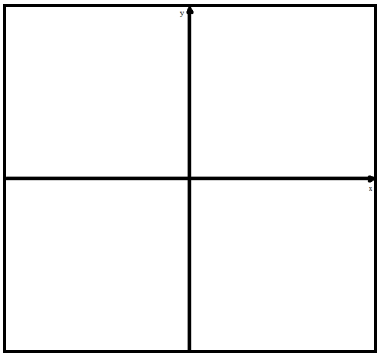
(i) $3x + (x-3) = 9$ (ii) $-4y + 3(2y - 5) = 12$ (iii) $2x - (x - 2) = 5$

(D)SUBSTITUTION Examples: Solve and verify the following linear systems:

(i) $y = 2x - 4$ and $y = -x + 5$

Algebraic Verification:

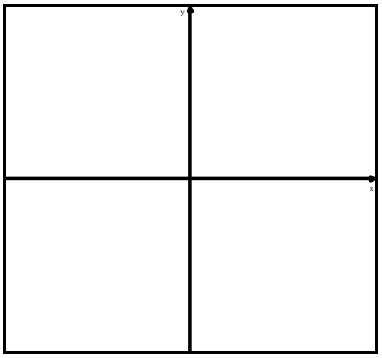
Graphic Verification:



(ii) $2x + 3y - 9 = 0$ and $y = -x - 2$

Algebraic Verification:

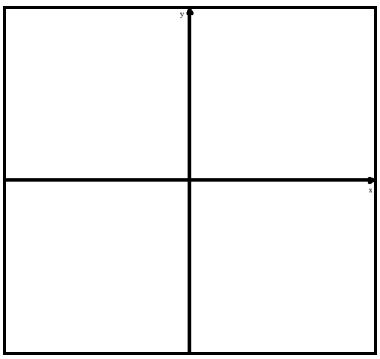
Graphic Verification:



(iii) $y = 5x - 2$ and $6x + 3y = 36$

Algebraic Verification:

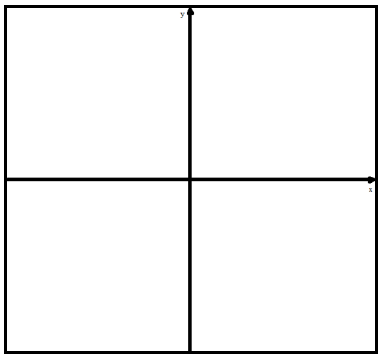
Graphic Verification:



(iv) Solve the system $\begin{aligned} 4x + 2y &= 10 \\ 3y - 6x &= 9 \end{aligned}$

Algebraic Verification:

Graphic Verification:



(E) FASTER FIVE: Decide what operation – addition or subtraction – would result in the elimination of a variable.

$\begin{aligned} 9x + y &= 4 \\ 14x + y &= -1 \end{aligned}$

$\begin{aligned} 3x - y &= 50 \\ 12x + y &= 115 \end{aligned}$

$\begin{aligned} -7x - 6y &= 338 \\ 9x + 6y &= -366 \end{aligned}$

$\begin{aligned} 18x - 5y &= 454 \\ 12x - 5y &= 316 \end{aligned}$

$\begin{aligned} 19x + 2y &= 102 \\ 19x - 2y &= 50 \end{aligned}$

$\begin{aligned} 17x - 8y &= 323 \\ 6x + 8y &= 114 \end{aligned}$

$\begin{aligned} 9x - 4y &= 235 \\ 15x + 2y &= 409 \end{aligned}$

$\begin{aligned} 7x - 16y &= 441 \\ 7x - 17y &= 476 \end{aligned}$

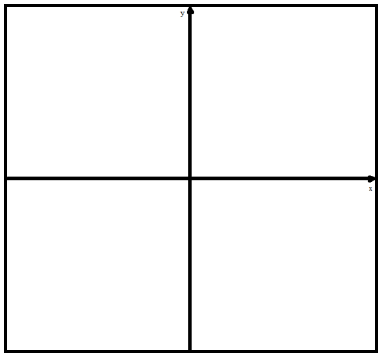
$\begin{aligned} 5x - 3y &= 188 \\ 6x - 11y &= 344 \end{aligned}$

(F) ELIMINTION Examples: Solve and verify the following linear systems:

(i) $2x - 2y - 14 = 0$
$-2x + 4y - 4 = 0$

Algebraic Verification:

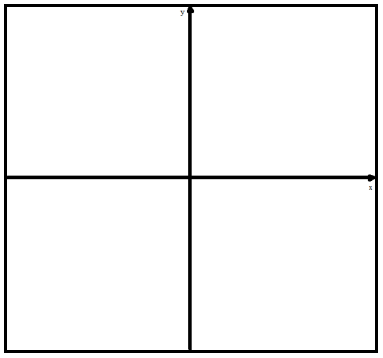
Graphic Verification:



(ii) $3x - 2y = 17$
$-6x - 2y = 8$

Algebraic Verification:

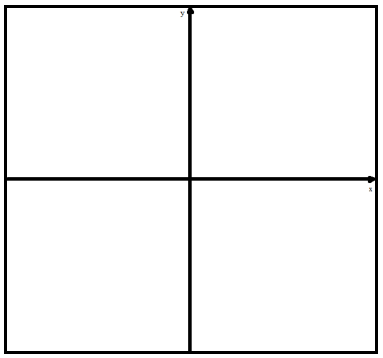
Graphic Verification:



(iii) $y + 4x = 9$
$3y - 6x = 9$

Algebraic Verification:

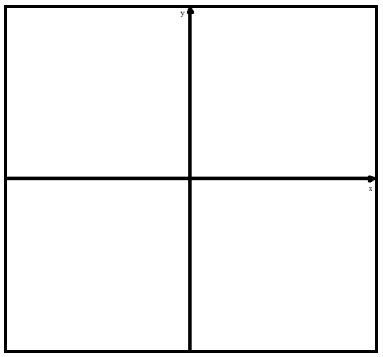
Graphic Verification:



(iv) $-6x + 2y = -4$
$3x + y = 1$

Algebraic Verification:

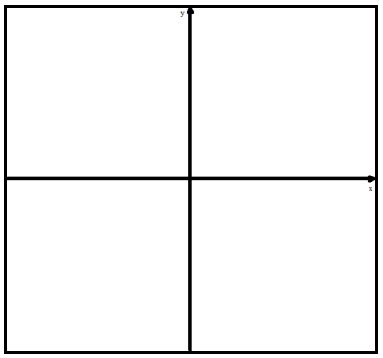
Graphic Verification:



(v) Solve the system $4x + 2y = 10$
$3y - 6x = 9$

Algebraic Verification:

Graphic Verification:



(G)Application of Linear Systems

❖ Ex 1. Guarantee Pool Repair Services charges $50 for a service call and $40/hour for labour. Oasis Pools and Spas charges $30 for a service call plus $45 for labour. Find the length of a service call for which both companies charge the same amount

EXPLAIN WHAT: the two variables should represent ➔ let x be …… let y be ……

EXPLAIN WHY: the 2 equations are ➔ $y = 50 + 40x$ as well as $y = 30 + 45x$

❖ Ex 2. Regina is training for the upcoming cross country season. She needs to design a daily 45 minute workout using a combination of a stationary bike and a treadmill. To be in top shape, she should burn 400 calories in her workout. On a bike, she burns 8 cal/min and on the treadmill she burns 10 cal/min. How many minutes should she train on each piece of equipment?

EXPLAIN WHAT: the two variables should represent ➔ let x be …… let y be ……

EXPLAIN WHICH PAIR OF EQUATIONS ARE CORRECT:

option (1) ➔ $x + y = 400$ as well as $8x + 10y = 45$

option (2) ➔ $x + y = 45$ as well as $8x + 10y = 400$

❖ Ex 3. As the owner of a banquet hall, you are in charge of catering a reception. There are 2 dinners: a chicken dish that costs $16 and a beef dish that costs $18. The 300 wedding guests have ordered the dinners in advance and the total cost to prepare the dinners is $5256. How many of each type of dinner are you preparing?

EXPLAIN WHAT: the two variables should represent ➔ let x be …… let y be ……

EXPLAIN WHICH PAIR OF EQUATIONS ARE CORRECT:

option (1) ➔ $x + y = 300$ as well as $16x + 18y = 5256$

option (2) ➔ $x + y = 5256$ as well as $16x + 18y = 300$

❖ Ex 4. You are selling tickets for a musical at ISM. Student tickets cost $5 and general admission tickets cost $8. If you sell 500 tickets and collect $3475, how many student tickets and how many general admission.