Date: Title:

(A) **Lesson Objectives:**

a. Introduce a Linear System through a real world application
b. Review fundamental algebra skills necessary to algebraically solve linear systems
c. Algebraically, using substitution, determine the intersection point of two lines and algebraically verify the intersection point.
d. Understand that linear systems can have no solutions, a unique solution, or infinite solutions

(B) Opening Investigation:

Last night, the students at Trillium High School staged a drama festival at a local theatre. Student tickets were priced at $4.00 and adult tickets were $12.00. For the show, 300 tickets were sold and the box office collected $3024. We need to determine how many adult tickets and how many student tickets were sold?

a. Let S represent the number of student tickets sold and let A represent the number of adult tickets sold

b. Write a linear equation representing the number of tickets sold ➔ _____.

c. Write a linear equation representing the money collected ➔ _____.

d. Select ONE of your two equations. Isolate one of the variables ➔ _____.

e. Substitute the expression from Step (d) into the SAME variable in the SECOND equation

f. Solve your expression in Step (e).

g. What does the solution from Step (f) represent?

h. So how many of each type of tickets were sold?

i. In Step (d), you isolated one of the variables. Now isolate the OTHER VARIABLE and repeat Steps (e) – (g)

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(C) **Foundational Algebra Skills**

a. Evaluating equations ➔ Substitution into equations

evaluate $2x + 4 – 5(x + 4) – 4$ if $x = -2$

evaluate $½x + 2(2x + 3) + 4x$ if $x = 4$

evaluate $2x + 4 – 5(x + 4) – 4$ if $x = K$

evaluate $2x + 4 – 5(x + 4) – 4$ if $x = (2 + y)$

b. Simplifying expressions:

$2(4 + 2x) + 5(x + 6) + 3x$

$-2(1 + 3x) - 4(2x + 5) + x$

$3x – 2(4 + 2x) + 5(x + 6)$

c. Solving linear equations:

solve $2x + 10 = -2(-3 + x)$

solve $2x + 10 + x = -2(-3 – 2x)$

$x/2 + 6/5 = x + 7/10$

d. Isolating variables in linear equations:

isolate "y" if $2x – 3y + 9 = 0$

isolate "x" if $2x – 3y + 9 = 0$

isolate "y" if $2x – 3(y+2) + 9 = 0$

isolate "x" if $-3x – y + 5 = 0$

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(D) **Further Examples for Classwork**

a. Example #1: Solve and verify the following linear systems:

$2x+3y-9=0$ and $x-y-2=0$ $y=5x-2$ and $6x+3y=36$

$x+4y=-10$ and $2x+y=1$ $2x-y+6=0$ and $2y-4x=14$

(E) 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

(F) **Homework/Resources**

- HOMEWORK: from the Nelson Textbook: S1.8, p92-95, Q1,3,7,8,11
- Help from OnlineMathLearning with slope ➔ http://www.onlinemathlearning.com/solving-systems-of-equations-3.html