Name _____ **Key**

1.) J. P. is thinking of two numbers. The sum of the numbers is 163, and their difference is 33. Define the variables and write two equations that would be used to solve the system.

var 1. one # a
var 2. another # b

eq.1: $a + b = 163$

eq.2: $a - b = 33$

2.) The school's photographer took pictures of couples at this year's prom. She charged $3.25 for wallet-size pictures and $10.50 for portrait-size pictures. Crystal and Dan bought a total of 10 pictures for $61.50. Define the variables and write two equations that would be used to solve the system.

wallet: w
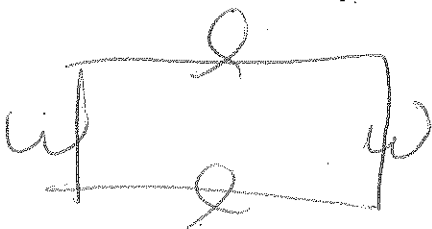portrait: p

$3.25w + 10.50p = 61.50$

$w + p = 10$

$2\ell + 2w = 78$ $\ell = +7$

3.) The perimeter of a rectangle is 78 cm. The length is 7 more than the width. Write two equations that would be used to solve the system.

$2\ell + 2w = 78$

$w + 7 = \ell$

ℓ: length
w: width

4.) A cash register contains 53 coins worth $4.40. They are all nickels and dimes. Write two equations that would be used to solve the system.

nickels: n $.05$

dimes: d $.10$

eq: $.05n + .10d = 4.40$

eq: $n + d = 53$

5.) McKinney Boyd Theatre sold 210 tickets and collected a total of $1530 in ticket sales for the Sunday matinee of *Peter Pan*. Admission was $11.00 for adults and $5.00 for children. Write two equations that would be used to solve the system.
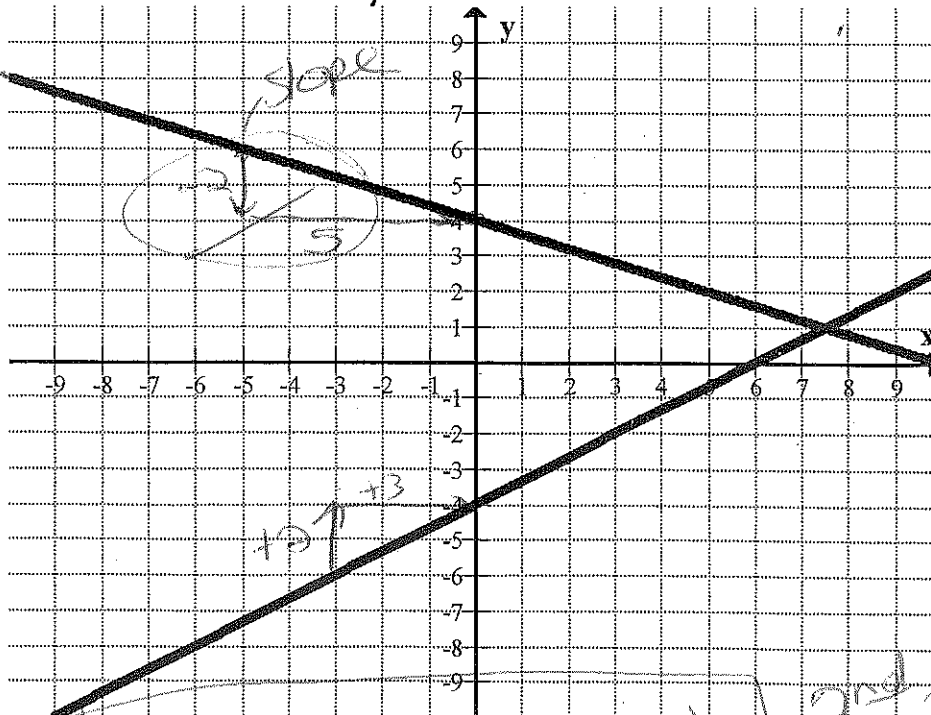
adults: a

children: c

eq: $11.00a + 5.00c = 1530$

eq: $a + c = 210$

6.) Write a system of equations that represents the given graph. What is the solution to the system?

$m = -\frac{2}{5}$

$b = 4$

$y = -\frac{2}{5}x + 4$

slope

$m = \frac{2}{3}$

$b = -4$

$y = \frac{2}{3}x - 4$

$+3$

Solution: $(7.5, 1)$

2nd trace

5
enter (3x)

7.) How many solutions does the following system have? Justify your answer.

$$y = -x + 3$$

$$2x + 2y = 8$$

$-2x \qquad -2x$

$$\frac{2y}{2} = \frac{-2x + 8}{2}$$

$$y = -x + 4$$

No Solution

Equations have same slope but different y-int so they are (parallel)

8.) Some values for two linear equations are shown in the tables below:

STAT EDIT STAT CALC

$y = x + 3$

x	y
2	5
4	7
6	9
8	11

+2, +2, +2, +2

10   13

$y = x + 3$

x	y
8	11
10	13
0	3
-2	1

What is the solution to the system of equations represented by these tables? Write you answer as an order pair and justify your answer.

Solution to a system is when both x & both y-values are the same

Infinitely many Solutions

This has many points they share → Same equation

9.) Find the solution: Best method → Substitution

$$\begin{cases} x = (y - 2) \\ x + 5y = 15 \end{cases}$$

$(y - 2) + 5y = 15$

$6y - 2 = 15$

$6y = 17$

$y = \frac{17}{6}$

$x = y - 2$

$x = \left(\frac{17}{6}\right) - 2$

$x = \frac{5}{6}$

$\boxed{\left(\frac{5}{6}, \frac{17}{6}\right)}$

10.) Find the solution:

$$\begin{cases} x + 3y = -8 \\ +x + y = -28 \end{cases}$$

$\frac{4y}{4} = \frac{-36}{4}$

$y = -9$

(x, y)

$(+19, -9)$

$x + 3y = -8$

$x + 3(-9) = -8$

$x + -27 = -8$

$ +27 +27$

$x = +19$

11.) Michael bought some tigerfish at $3 each and some goldfish at $4 each for his new aquarium. If Michael bought 12 fish and spent $40, what combination of fish did he buy? Show your work.

Tigerfish: T (x)
Goldfish: G (y)

EQ: $3T + 4G = 40$
EQ²: $T + G = 12$

Elimination

$3T + 4G = 40$
$-3(T + G = 12)$ reunse
$-3T - 36 = -36$
$G = 4$

$T + (4) = 12$
$T = 8$

$\boxed{(4, 8)}$

convert

$\frac{3T + 4G = 40}{-3T \qquad -3T}$

$\frac{4G}{4} = \frac{-3T + 40}{4}$

$\boxed{G = -\frac{3}{4}T + 10}$

$\frac{T + G = 12}{}$

$\boxed{G = -T + 12}$

Graph
2nd trace
5
enter (x)
$(4, 8)$

12.) Graph the system:

$y = 3x$

$x + 2y = -14$

$\rightarrow 2y = -x - 14 \rightarrow y = -\frac{1}{2}x - 7$

What is the solution?

$y = 3x$
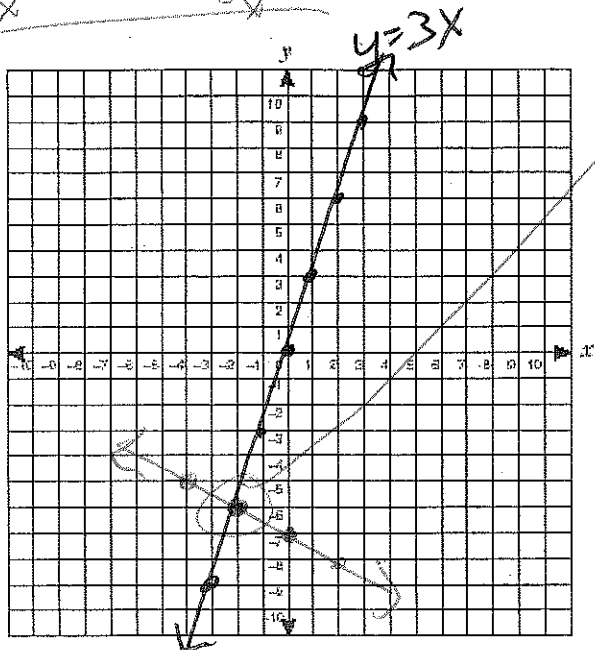
$(-2, -6)$

★ Verify

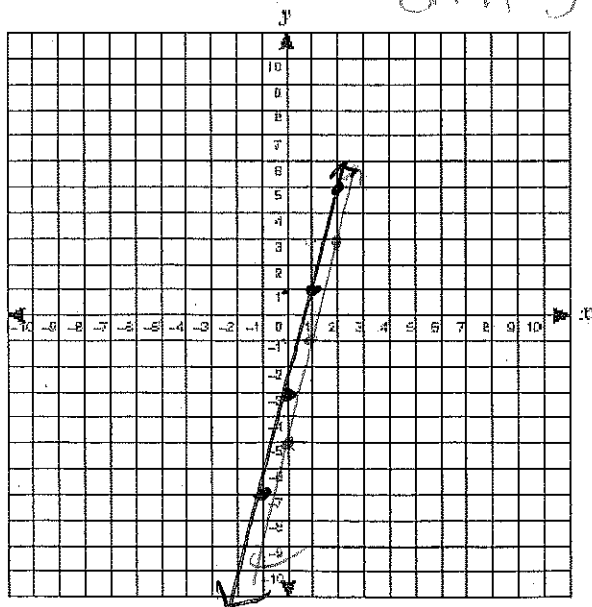$y = 3x$ $x + 2y = -14$

$-6 = 3(-2)$ $(-2) + 2(-6) = -14$

$-6 = -6 ✓$ $-14 = -14 ✓$

13.) Graph the system and write the solution.

$8x - 2y = 10 \rightarrow y = 4x - 5$

$y = 4x - 3$

same slope
diff y-int → parallel

No Solution

14.) Tight Tunes charges their customers $2 per song downloaded. Dynamite Downloads charges a $10 registration fee to become a member and $1.50 per song downloaded.

TT: $y = 2x$ DD: $y = 1.50x + 10$

Graph the system of equations.

When is Tight Tunes a better deal?

For less than 20 songs

When is Dynamite Downloads a better deal?

For more than 20 songs

What does the point (20, 40) represent in this situation? Use the words cost and number of downloads in your answer.

This represents when both TT & DD cost $40 for 20 songs.

15.) Describe the graphs of the following systems of equations:

1)   One unique solution : they will intersect at one point (solution)

2)   No solution : the graphs will be parallel

3)   Infinite solutions : the graphs will coincide (one on top of the other)