Jakarta International School

8th Grade – AG1

Practice Test - Green

Linear Systems

Name: Solutions

Date: 21/22 January 2010

Score: ___/28

Goal 6: Solve and apply linear systems

1. Estimate the solution of the linear system graphically. Then check the solution algebraically.

$x + 2y = -6 \quad \ldots(1)$

$-3x + y = -10 \quad \ldots(2)$

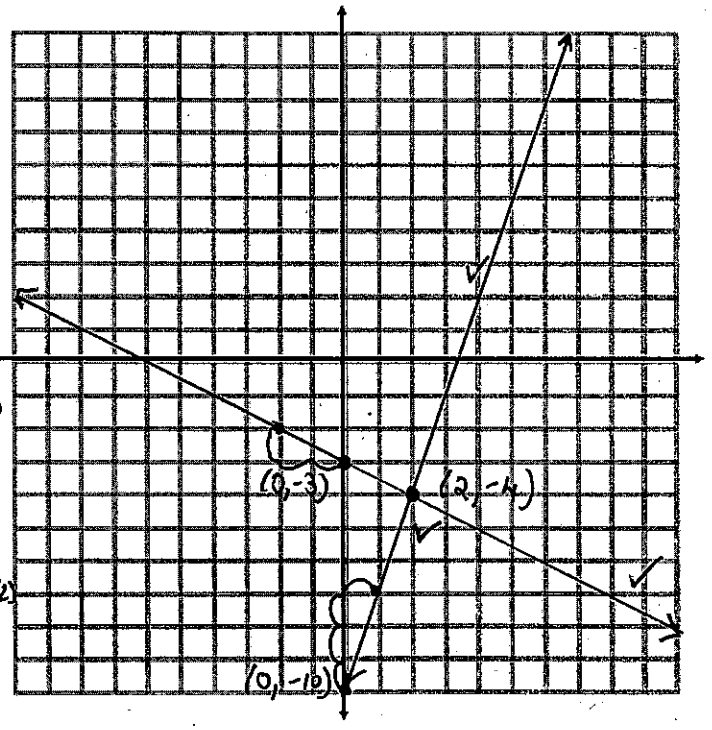
$x + 2y = -6 \quad \ldots(1)$

$\frac{2y}{2} = \frac{-x-6}{2}$

$y = \frac{-1}{2}x - 3$ ✓

$-3x + y = -10$

$y = 3x - 10$



Check:

$x + 2y = -6 \quad \ldots(1)$

$2 + 2(-4) = -6$

$2 - 8 = -6$

$-6 = -6$ ✓

$-3x + y = -10 \ldots(2)$

$-3(2) + (-4) = -10$

$-6 - 4 = -10$

$-10 = -10$ ✓

Point of intersection $(2, -4)$ ✓

(3)

2. Check whether the ordered pair is a solution of the system of linear equations. Show or explain how you know.

$-3x + y = 6 \qquad (-4,-6)$

$-x + y = -2$

$-3x + y = 6$

$-3(-4) + (-6) = 6$

$12 - 6 = 6$ ✓

$-x + y = -2$

$-(-4) + (-6) = -2$

$4 - 6 = -2$

$-2 = -2$ ✓

(2)

5

When doing number 3 and 4 you may choose either substitution or linear combination. If you use substitution in # 3 then you must use linear combination in # 4 and so you need to choose wisely. Your objective is to achieve a correct solution for each system and demonstrate your skill at each method.

3. Solve the linear system by substitution or linear combination.
   - Show all your work
   - Check your solution

$2y + 2x = 3 \quad \ldots(1)$ multiply by 2
$x - 4y = -1 \quad \ldots(2)$

Linear Combination

$4x + 4y = 6 \quad \ldots(1)$
$x - 4y = -1 \quad \ldots(2)$
$5x = 5$
$x = 1$ ✓

$x - 4y = -1 \quad \ldots(2)$
$1 - 4y = -1$
$-4y = -2$
$y = \frac{1}{2}$ ✓

Solution $(1, \frac{1}{2})$

Check:
$2y + 2x = 3 \quad \ldots(1)$
$2(\frac{1}{2}) + 2(1) = 3$
$1 + 2 = 3$
$3 = 3$ ✓

$x - 4y = -1 \quad \ldots(2)$
$(1) - 4(\frac{1}{2}) = -1$
$1 - 2 = -1$
$-1 = -1$

Substitution

$2y + 2x = 3 \quad \ldots(1)$
$x - 4y = -1 \quad \ldots(2)$

$x - 4y = -1 \quad \ldots(2)$
$x = 4y - 1$ ✓

$2y + 2x = 3 \quad \ldots(1)$
$2y + 2(4y - 1) = 3$
$2y + 8y - 2 + 2 = 3 + 2$
$10y = 5$
$y = \frac{1}{2}$ ✓ (3)

$x - 4y = -1 \quad \ldots(2)$
$x - 4(\frac{1}{2}) = -1$
$x - 2 = -1$
$x = 2 - 1$
$x = 1$

Solution is $(1, \frac{1}{2})$

4. Solve the linear system by substitution or linear combination.
   - Show all your work
   - Check your solution

$9x - 4y = -18 \quad \ldots(1)$ Multiply by 3
$-3x + 3y = 6 \quad \ldots(2)$ Multiply by 4

Linear Combination

$27x - 12y = -54 \quad \ldots(1)$
$-12x + 12y = 24 \quad \ldots(2)$
$\frac{15x}{15} = \frac{-30}{15}$ ✓
$x = -2$

$-3x + 3y = 6 \quad \ldots(2)$
$-3(-2) + 3y = 6$
$6 + 3y = 6$
$3y = 0$
$y = 0$ ✓

Solution is $(-2, 0)$

Check:
$9x - 4y = -18 \quad \ldots(1)$
$9(-2) - 4(0) = -18$
$-18 = -18$ ✓

$-3x + 3y = 6 \quad \ldots(2)$
$-3(-2) + 3(0) = 6$
$6 = 6$

Substitution

$9x - 4y = -18 \quad \ldots(1)$
$-3x + 3y = 6 \quad \ldots(2)$

$\frac{3x}{3} = \frac{-3y + 6}{-3}$
$x = y - 2$

$9x - 4y = -18 \quad \ldots(1)$ (3)
$9(y - 2) - 4y = -18$
$9y - 18 + 18 - 4y = -18 + 18$
$5y = 0$ ✓
$y = 0$

$-3x + 3y = 6 \quad \ldots(2)$
$-3x + 3(0) = 6$
$\frac{-3x}{-3} = \frac{6}{-3}$ ✓
$x = -2$

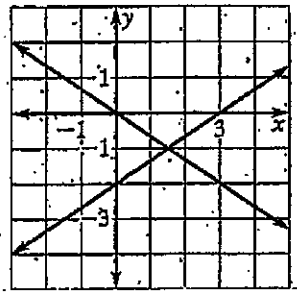
5. Match the graph with its linear system and tell how many solutions the system has

A. $-9x+3y=-6$
$-3x+y=-2$

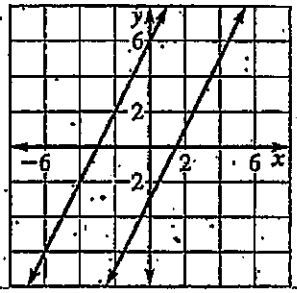
B. $-2x+3y=-6$
$2x+3y=0$

C. $x-4y=7$
$5x+y=-7$

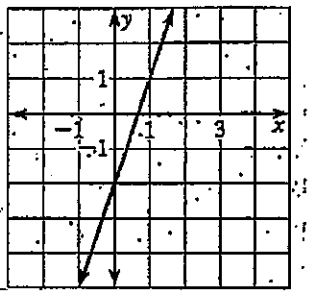
D. $-2x+y=6$
$-4x+2y=-6$



Graph 1 (2)



Graph 2 (2)



Graph 3 (2)

6

	Graph 1		Graph 2		Graph 3
Letter Choice	B		D		A
No. of solutions	one solution		no solution		infinite solutions

6. You sold two different types of wrapping paper for your fundraiser. One type sold for $ 6 and the other for $ 8 . You collected $ 92 for the 14 rolls you sold. How many rolls of each type did you sell?

Let x represent the \$6 wrapping paper ✓
Let y represent the \$ 8 wrapping paper.

$x + y = 14 \quad \ldots (1)$
$6x + 8y = 92 \quad \ldots (2)$ ✓

(5)

$x + y = 14 \ldots (1)$
$x = -y + 14$

$6x + 8y = 92 \ldots (2)$
$6(-y+14) + 8y = 92$
$-6y + 84 + 8y = 92$ ✓
$2y + 84 = 92$
$2y = 8$
$y = 4$

(10, 4)

✓
$x + y = 14 \ldots (1)$
$x + 4 = 14$
$x = 10$ ✓

I sell 10 rolls of \$6 wrapping paper and 4 rolls of \$8 wrapping paper

7. A pharmacy mailed 300 advertisements, smaller advertisements requiring $ 0.3 postage and larger advertisements requiring $ 0.5 postage. If the cost of the postage is $ 130, find the number of advertisements mailed at each rate.

Let x be the number of smaller advertisements for \$0.3 postage ✓
Let y be the number of larger advertisements for \$0.5 postage

$x + y = 300 \quad \ldots (1)$ multiply by -0.5 ✓
$0.3x + 0.5y = 130 \quad \ldots (2)$

$-0.5x - 0.5y = -150 \quad \ldots (1)$
$0.3x + 0.5y = 130 \quad \ldots (2)$
$(-10)(-0.2x) = -20(-10)$

(6)

$2x = 200$ ✓
$x = 100$

$x + y = 300 \quad \ldots (1)$
$100 + y = 300$
$y = 200$ ✓

Solution $(100, 200)$ ✓

100 smaller advertisements were mailed at a rate of \$0.3 postage ✓
200 larger advertisements were mailed at a rate of \$0.5 postage

(11)