

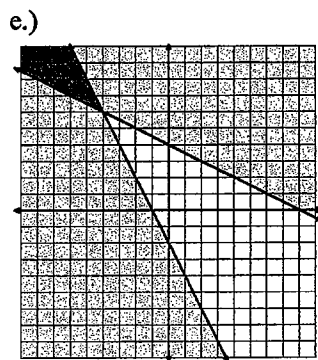
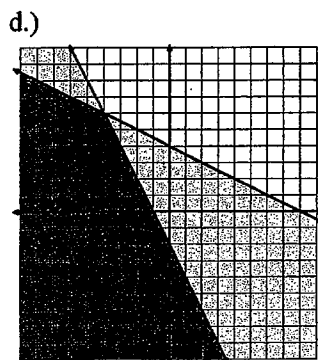
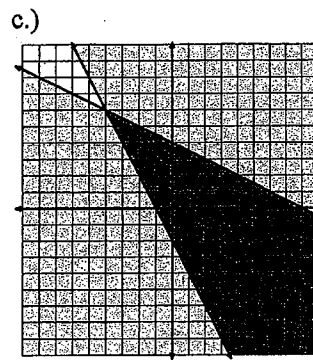
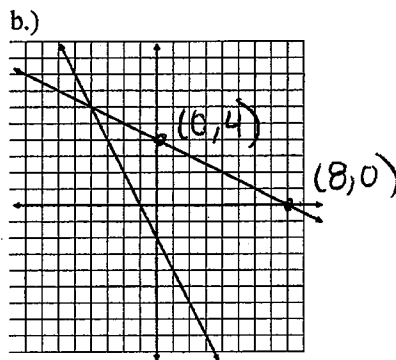
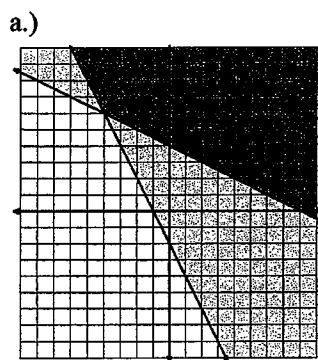
Sample Module 2 Test (GROUP TEST)
Systems of Equations and Inequalities

Name: Key

Part I: Matching *Graph find x-int y-int*

For #1-5, match each system on the left with the corresponding graph on the right.

<u>B</u> 1. $\begin{cases} x+2y=8 \\ -4x-2y=4 \end{cases}$	<u>C</u> 2. $\begin{cases} x+2y \leq 8 \\ -4x-2y \leq 4 \end{cases}$	<u>D</u> 3. $\begin{cases} x+2y \leq 8 \\ -4x-2y \geq 4 \end{cases}$
<u>A</u> 4. $\begin{cases} x+2y \geq 8 \\ -4x-2y \leq 4 \end{cases}$	<u>E</u> 5. $\begin{cases} x+2y \geq 8 \\ -4x-2y \geq 4 \end{cases}$	



Review
 1. $x+2y=8$
 set $x=0$ to find y -int
 $0+2y=8$
 $y=4 \rightarrow (0, 4)$
 set $y=0$ to find x -int
 $x+2(0)=8$
 $x=8 \rightarrow (8, 0)$

Part II: Multiple Choice

6. The point $(-4, 6)$ is a solution to which of the following system(s)? **Select all that apply.** AD

- a. $\begin{cases} x+2y=8 \\ -4x-y=10 \end{cases}$ b. $\begin{cases} x+2y \leq 8 \\ -4x-y < 10 \end{cases}$ c. $\begin{cases} x+2y < 8 \\ -4x-y \geq 10 \end{cases}$ d. $\begin{cases} x+2y \geq 8 \\ -4x-y \leq 10 \end{cases}$ e. $\begin{cases} x+2y > 8 \\ -4x-y > 10 \end{cases}$

check both
 $(-4) + 2(6) = 8$
 $-4 + 12 = 8$
 $8 = 8 \checkmark$
 $-4(-4) - (6) = 10$
 $16 - 6 = 10$
 $10 = 10 \checkmark$

substitute
 $-4(-4) - (6) < 10$
 $16 - 6 < 10$
 $10 < 10$
False

7. How many solutions might a linear equation have? Select all that apply.

- a. None b. One **c. Infinite**

8. How many solutions might a system of linear equations have? Select all that apply.

- a. None** b. One c. Infinite



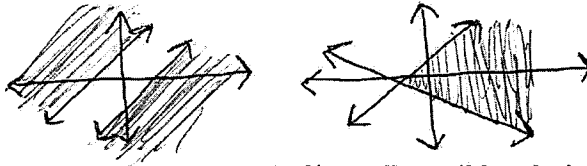
9. How many solutions might a linear inequality have? Select all that apply.

- a. None b. One **c. Infinite**



10. How many solutions might a system of inequalities have? Select all that apply.

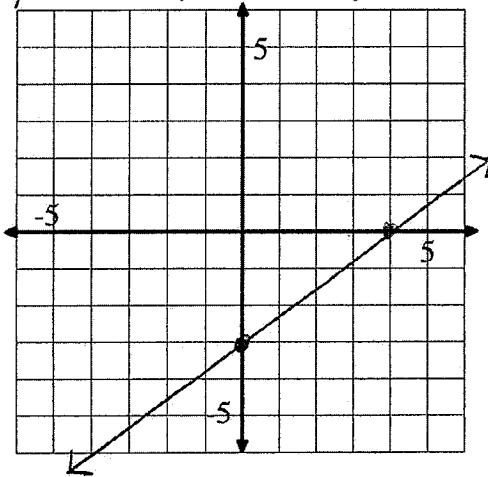
- a. None** b. One c. Infinite



Part III: Short Answer

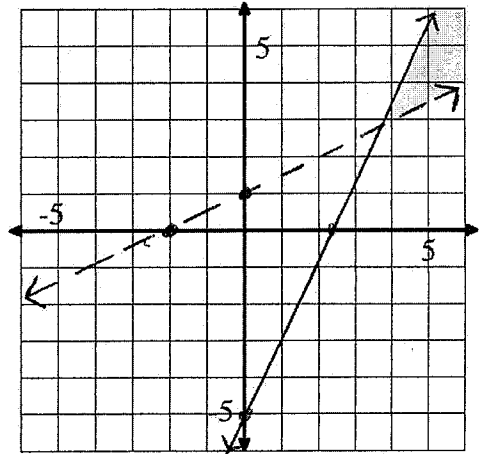
11. Show all possible solutions to the equation $3x - 4y = 12$ on the graph. Label the **x-intercept** and **y-intercept**.

X-intercept (4,0)
Y-intercept (0,-3)



12. Show all possible solutions to the system of inequalities on the graph.

$$\begin{cases} -x + 2y > 2 & \text{x-int } (-2,0) \text{ \& y-int } (0,1) \\ -2x + y \leq -5 & \text{x-int } (\frac{5}{2},0) \text{ \& y-int } (0,-5) \end{cases}$$



13. Convert the following Standard Form equation to Slope-Intercept Form.

Standard Form

$$2x - 3y = 6$$



Slope-Intercept Form

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

14. Convert the following Slope-Intercept Form equation to Standard Form.

Slope-Intercept Form

$$y = -\frac{4}{5}x + 7$$



Standard Form

$$4x + 5y = 35$$

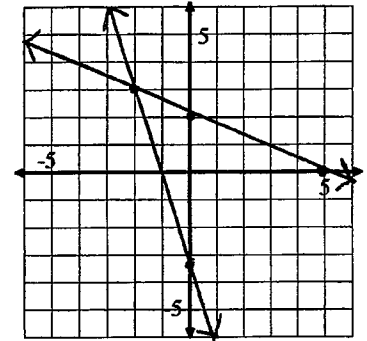
$$\begin{aligned} -5 \left[y = -\frac{4}{5}x + 7 \right] \\ -5y = 4x - 35 \end{aligned}$$

$$\begin{aligned} -5y &= 4x - 35 \\ +35 & \quad \quad +35 \\ \hline 35 - 5y &= 4x \end{aligned}$$

$$\begin{aligned} 35 &= 4x + 5y \\ 4x + 5y &= 35 \end{aligned}$$

15. Solve the following system of equations using 2 methods of your choosing (graphing, substitution, or elimination). A graph has been provided in case you have chosen that method, though you do not have to use it.

$$\begin{cases} 3x + y = -3 \\ x + 2y = 4 \end{cases}$$



$$2(3x + y = -3)$$

$$6x + 2y = -6$$

$$\ominus x + 2y = 4$$

$$5x = -10$$

$$\boxed{x = -2}$$

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

$$2y = 6$$

$$\boxed{y = 3}$$

$$\boxed{(-2, 3)}$$

c : price of can of soda b : price of bag of chips price

16. Three cans of soda and two bags of chips cost \$2.72 and two cans of soda and four bags of chips cost \$3.92. What is the cost of each item? Express the situation as equations, using c to represent the number of cans of soda and b to represent the number of bags of chips. Solve your system of equations algebraically and write the solution in context of the problem. Verify your solution is correct by plugging in.

$$\begin{array}{l} \text{Equations} \\ 3c + 2b = 2.72 \\ 2c + 4b = 3.92 \end{array}$$

Each can of soda costs \$.38 and each bag of chips cost \$.79.

$$2(3c + 2b = 2.72)$$

$$6c + 4b = 5.44$$

$$\ominus 2c + 4b = 3.92$$

$$4c = 1.52$$

$$\boxed{c = \$0.38}$$

$$2(0.38) + 4b = 3.92$$

$$0.76 + 4b = 3.92$$

$$4b = 3.16$$

$$\boxed{b = \$0.79}$$

17. Mary loves to paint pastel and watercolor pictures. Each pastel uses \$7 in supplies and each watercolor uses \$10 in supplies. Mary has no more than \$80 to spend on supplies. She has time to make at most 12 pictures. Express Mary's constraints as inequalities, using p to represent the number of pastel pictures she makes and w to represent the number of watercolor pictures. ~~Verify your solution is correct by plugging in.~~

$$7p + 10w \leq 80$$

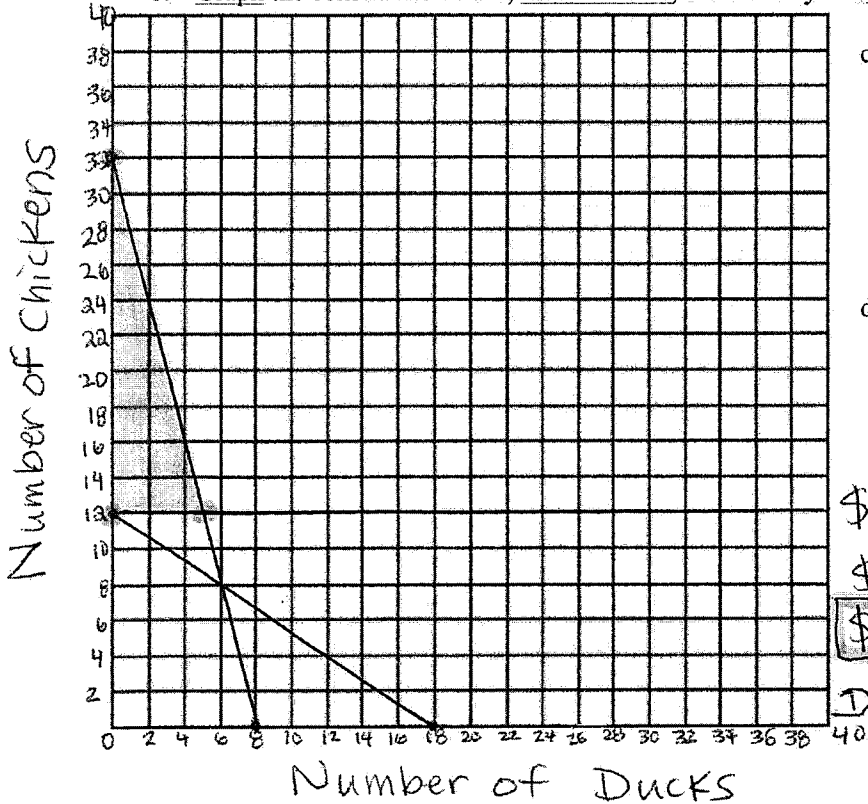
$$p + w \leq 12$$

18. Old McDonald had a Cow farm, but is now considering branching into raising Chickens and Ducks. Everyday Mr. McDonald needs to collect at least 36 eggs, and he knows that each Duck lays 2 eggs, while each Chicken lays 3 eggs. But each week, every Duck eats 4 pounds of feed, while every Chicken eats 1 pound of feed. Mr. McDonald can afford no more than 32 pounds of feed. Mr. McDonald already has 12 chicken on his farm. Mr. McDonald can sell each Chicken egg for \$0.50 and each Duck egg for \$1.

a. Define your variables below. Identify and name your constraints in context. Use as many boxes as needed.

Define variables: D = number of ducks and C = number of chickens	
Name of constraint: Eggs Collected	Identify constraint: $2D + 3C \geq 36$
Name of constraint: Pounds of Feed	Identify constraint: $4D + 1C \leq 32$
Name of constraint: Number of Chickens	Identify constraint: $C \geq 12$
Name of constraint: —	Identify constraint: —
Name of constraint: —	Identify constraint: —

b. Graph the constraints below, label the axes, and identify the feasible region.



c. Identify the coordinate points of the corners of the feasible region.

- (0, 12)
- (0, 32)
- (8, 12)

d. What combination of Chickens and Ducks will earn Mr. McDonald the greatest profit and what will that maximum profit be?

$$P = 1D + .50C$$

$$\$12 = 1(0) + .50(12)$$

$$\$6 = 1(0) + .50(32)$$

$$\$16 = 1(8) + .50(32)$$

Mr. McDonald would need 0 Ducks and 32 chickens to maximize profit, \$16.

$2D + 3C \geq 36$ x-int (18, 0) and y-int (0, 12)
 $4D + 1C \leq 32$ x-int (8, 0) and y-int (0, 32)
 $C \geq 12$ x-int NONE and y-int (0, 12) ← horizontal line at y = 12