

# Applications of Systems

## Agenda

- Warm-Up
- HW Check
- Homework
  - 2 pages
- Test Tmr!
- ALL HW due tmr by 4:10.

## Objective

You will solve real-world situations using systems

$$\begin{aligned}
 q &= .25 \\
 d &= .10 \\
 n &= .05
 \end{aligned}$$

2. Which ordered pair is not the solution set to the following system of inequalities?

$$3x + y > -3$$

$$x + 2y < 4$$

A. (1, 1)

B. (-1, 2)

C. (4, -3)

D. (-5, 1)

Test taking strategy:  
bottom

$$\begin{aligned}
 3(-5) + 1 & > -3 \\
 -14 & > -3?
 \end{aligned}$$

2. Emilio has \$4.95 in quarters and dimes. He has three times as many dimes as quarters. Set up a system to determine how many quarters he has.

$$\begin{array}{r}
 + \quad + \quad + \\
 75 \quad -30 \quad 0
 \end{array}$$

more dimes

$$.25q + .10d = 4.95$$

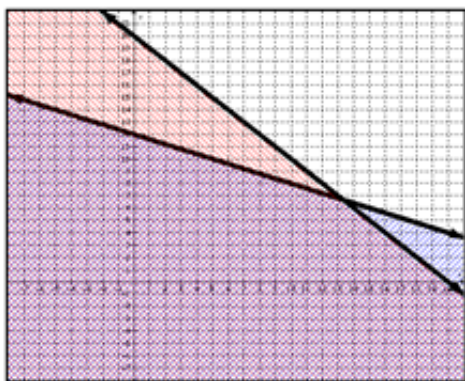
$$d = 3q$$

1.  $y \geq 3x - 4$  and  $y \leq -\frac{1}{2}x + 2$

2.  $y > -\frac{1}{2}x + 1$  and  $y \leq -x + 3$

3. C.

4. A.



$$x + y \leq 20$$

$$2x + 5y \leq 60$$

B. No

C. No

D. 8

E. 0 (min) and 14 (max)

5. A

6. C

7. D

8. D

## Algebra I - Unit 6: Topic 2 – Systems of Inequalities

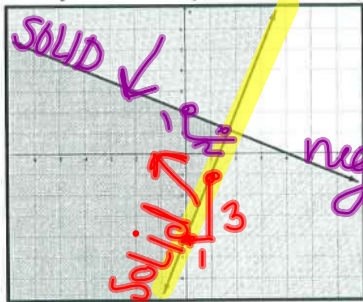
## Practice – Systems of Inequalities Day 2

pp 421-426

Name \_\_\_\_\_ Date \_\_\_\_\_ Period \_\_\_\_\_

Write a system of inequalities for the graphs below.

1.

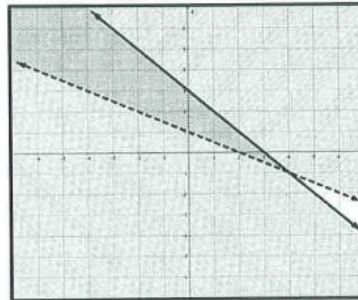


Inequalities

$$y \geq -\frac{3}{2}x + 4$$

$$y < -\frac{1}{2}x + 2$$

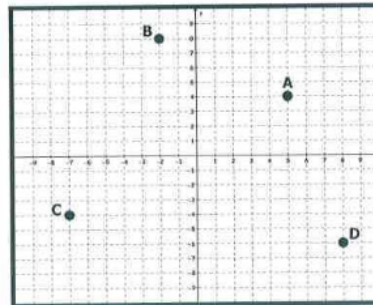
2.



Inequalities

 \_\_\_\_\_  
 \_\_\_\_\_
3. For which point is  $y \geq -\frac{9}{2}$  and  $x < -\frac{17}{5}$ ?

- A. Point A  
 B. Point B  
 C. Point C  
 D. Point D



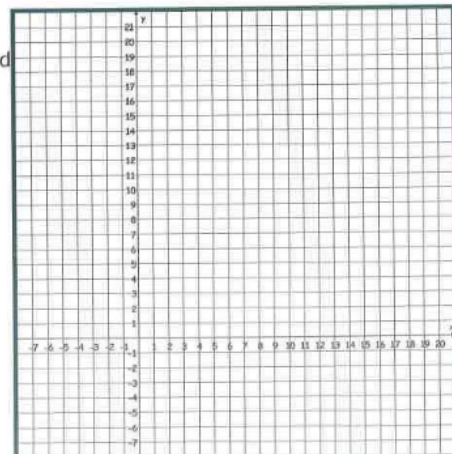
4. Jessica is buying hats for everyone invited to her birthday. The Party Store is selling party hats for \$2 each and crowns for \$5 each. Jessica expects no more than 20 people.

- A) Write and solve (by graphing) the system of inequalities to find out how many party hats,  $x$ , and crowns,  $y$ , Jessica can buy if she does not want to spend more than \$60.

B) Is the ordered pair  $(-5, 10)$  a solution to this situation?C) Is the ordered pair  $(2.5, 8.5)$  a solution to this situation?

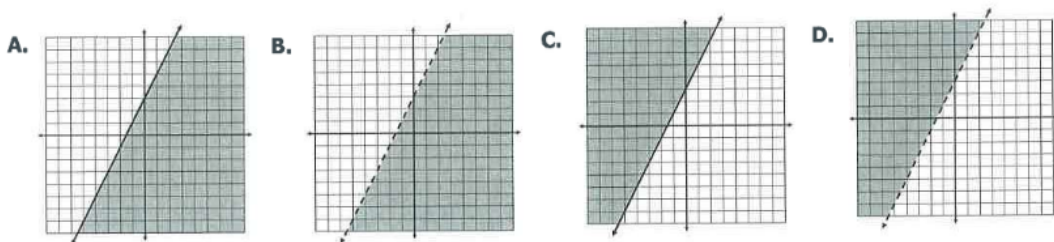
D) If Jessica decides to buy 9 party hats, what is the maximum number of crowns she can buy?

E) If Jessica decides to buy 6 crowns, what is the minimum and maximum number of party hats she can buy?

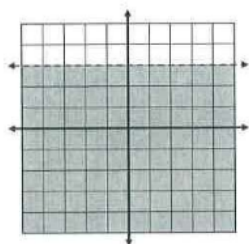


## Algebra I - Unit 6: Topic 2 – Systems of Inequalities

5. Which graph represents the solution to the inequality  $2x - y \geq -3$ ?

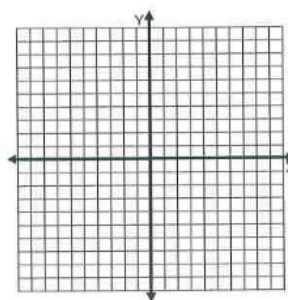


6. Which inequality is shown in the graph?



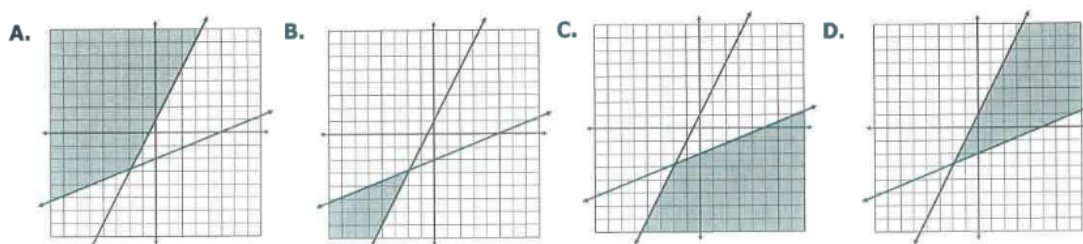
- A.  $x < 3$       C.  $y < 3$   
 B.  $x > 3$       D.  $y > 3$

7. In the graph of  $y \leq x$ , which quadrant is completely shaded? Use the graph below to determine.



- A. Quadrant I  
 B. Quadrant II  
 C. Quadrant III  
 D. Quadrant IV

8. Which graph represents the following system of inequalities?  
 $y \leq 2x + 1$   
 $2x - 5y \leq 10$



For each of the following: define the variables, write the system of equations and then solve using the 'best' method.

1. Coach P. made 4 shots in basketball practice this morning, ~~no free throws~~. The combination of 3-pointers and 2-pointers totaled 11 points. How many baskets were 3-pointers?

Let  $x$  be three-pointers  
Let  $y$  be two-pointers

$$\begin{aligned} -2x + y &= 4 \\ 3x + 2y &= 11 \end{aligned}$$

$$\begin{aligned} -2x + -2y &= 8 \\ 3x + 2y &= 11 \end{aligned}$$

Elimination  $y$

$$\boxed{x = 3}$$

3 three pointers

2. The drama department sold 300 tickets for their last show. Adult tickets cost \$10 and student tickets cost \$5. If they sold \$2750 worth of tickets, what is a reasonable conclusion that can be made about the tickets?

~~A~~ Only adults bought tickets  $300(10) = 3000$

☒ B More adults than students bought tickets

C More students than adults bought tickets

~~D~~ The same number of adults and students bought tickets

$$\begin{aligned} 150(10) + 150(5) \\ 1500 + 750 = 2250 \end{aligned}$$

$$\begin{aligned} -5(x + y) &= -300 \\ 10x + 5y &= 2750 \\ -5x - 5y &= -1500 \\ \hline 5x &= 1250 \\ x &= 250 \end{aligned}$$

3. At a restaurant the cost for a breakfast taco and a small glass of milk is \$2.10. The cost for 2 tacos and 3 small glasses of milk is \$5.15. Find the cost of one taco and one glass of milk.

$$\begin{aligned} t + m &= 2.10 \\ 2t + 3m &= 5.15 \end{aligned}$$

$$\begin{aligned} t &= \$1.15 \\ m &= \$0.95 \end{aligned}$$

- ~~4.~~ The members of a new band want to spend no more than \$70 for at least 60 fliers to advertise their upcoming concert. The cost to produce a color flier is \$1.50 per flier. The cost to produce a black and white flier is \$0.75 per flier. If the members of the band want to get the maximum number of fliers made for \$70 using both color and black and white fliers, which of the following is a reasonable solution?

- A The band can order 26 color fliers and 30 black and white fliers.  
B The band can order 30 color fliers and 40 black and white fliers.  
C The band can order 30 color fliers and 32 black and white fliers.  
D The band can order 60 color fliers.

- ~~5.~~ Cody likes to snack on pecans and almonds. Pecans sell for \$3 a pound and almonds sell for \$4 a pound. Cody wants to buy a mixture of nuts that weighs no more than 5 pounds, and he plans to spend at most \$18.00. Find three possible solutions to this situation.

9

6. Two complementary angles have measures of  $s$  and  $t$ . If  $t$  is 9 less than twice  $s$ , which system of linear equations can be used to determine the measure of each angle?

~~A~~  $\begin{aligned} t + s &= -9 \\ t &= 2s + 90 \end{aligned}$

~~B~~  $\begin{aligned} t - s &= -9 \\ t &= 2s - 90 \end{aligned}$

☒ C  $\begin{aligned} t + s &= 90 \\ t &= 2s - 9 \end{aligned}$

~~D~~  $\begin{aligned} t + s &= 90 \\ t &= -2s - 9 \end{aligned}$

is  $\rightarrow$  EQUALS

substitution

$$\begin{aligned} s + t &= 90 \\ t &= 2s - 9 \end{aligned}$$

~~X~~ Marisela owns a clothing store that sells hats and shirts. All of the hats cost the same,  $x$  dollars, and all of the shirts cost the same,  $y$  dollars. The following customers came into the store and made purchases:

Frank bought two shirts and a hat for a total of \$17.00.

Allison bought four shirts and three hats for a total cost of \$37.00.

Judy bought six shirts and three hats for a total cost of \$51.00.

A. Write three equations that represent these situations.

B. Do Frank and Allison's purchases provide enough information to determine the price for each shirt and each hat? If so, find these prices and show your work. If not, explain why not.

C. Explain why you can't use Frank and Judy's purchases to determine the price for each shirt and hat.

8. An isosceles triangle has legs that are each  $x$  inches long and a base that is  $y$  inches long. The perimeter of this triangle is 38 inches. The base is 8 inches shorter than the length of a leg. Which system of linear equations can be used to find the length of each of the 3 sides?

~~X~~ A  $2x + y = 38$   
 $y = x - 8$

~~X~~ C  $2x + 2y = 38$   
 $x = y - 8$

~~X~~ B  $2x + 2y = 38$   
 $y = x - 8$

~~X~~ D  $2x + y = 38$   
 $x = y + 8$



$$x + x + y = 38$$

$$2x + y = 38$$

Rectangle  
 $P = 2l + 2w$

- ~~X~~ 9. Hunter has a jar of 368 nickels and dimes. The total value of the coins is \$28.40. How many nickels and dimes does Hunter have?

10. Juan bought a total of 52 cans of Dr. Pepper and Sprite. There were three times as many cans of Dr. Pepper as Sprite. How many cans of Dr. Pepper did he buy?

Let  $x$  be Dr. Pepper  
Let  $y$  be Sprite

more DP

$$x + y = 52$$

$$x = 3y$$

39 cans  
of Dr. Pepper

$$3y + y = 52$$

$$4y = 52$$

$$y = 13 \text{ cans Sprite}$$

Test tomorrow over ALL of unit 6.

- If you do better on tomorrow's test, I will match the score for unit 6 test 1

ALL HW (late or otherwise) due tmr by 4:10.

Review is bonus points on test.

# solutions (purple foldable)