

System of Linear Inequalities Word Problems (7.6)

1. You can work at most 20 hours next week. You need to earn at least \$92 to cover your weekly expenses. Your dog-walking job pays \$7.50 per hour and your job as a car wash attendant pays \$6 per hour. Write a system of linear inequalities to model the situation.

x : hours dog walking

y : hours as car wash attendant

$$x + y \leq 20 \quad \leftarrow \text{Hours}$$

$$7.50x + 6y \geq 92 \quad \leftarrow \text{Money}$$

2. Marsha is buying plants and soil for her garden. The soil costs \$4 per bag, and the plants cost \$10 each. She wants to buy at least 5 plants and can spend no more than \$100. Write a system of linear inequalities to model the situation.

x : # of bags of soil

y : # of plants

$$4x + 10y \leq 100 \quad \leftarrow \text{Money}$$

$$y \geq 5 \quad \leftarrow \text{Plants}$$

3. Jonah is going to the store to buy candles. Small candles cost \$3.50 and large candles cost \$5.00. He needs to buy at least 20 candles, and he cannot spend more than \$80. Write a system of linear inequalities that represent the situation.

x : # of small candles

y : # of large candles

$$3.5x + 5y \leq 80 \quad \leftarrow \text{Money}$$

$$x + y \geq 20 \quad \leftarrow \text{# of candles}$$

4. During a family trip, you share the driving with your dad. At most, you are allowed to drive for three hours. While driving, your maximum speed is 55 miles per hour.

a) Write a system of inequalities describing the possible numbers of hours t and distance d you may have to drive.

$$t \leq 3 \quad (\text{can only drive 3 hrs at most})$$

$$\frac{d}{t} \leq 55 \quad (\text{speed is 55 mph at most})$$

REMEMBER:

$$\text{Speed} = \frac{\text{distance}}{\text{time}}$$

b) Is it possible for you to have driven 160 miles?

$$55 = \frac{160}{x}$$

$$x = 2.91$$

If I go at 55 miles per hour it will take 2.91 hours to drive 160 miles. 2.91 hours is under the 3 hour max that I can drive, so yes it's possible!

5. In basketball you score 2 points for a field goal and 1 point for a free throw. Suppose that you have scored at least 3 points in every game this season, and have a season high score of 15 points in one game. How many field goals and free throws could you have made in any one game?

a) Write a system of two inequalities that describes this situation.

x : # of field goals

y : # of free throws

$$2x + 1y \geq 3 \quad \leftarrow \text{minimum points}$$

$$2x + 1y \leq 15 \quad \leftarrow \text{maximum points}$$

b) Graph the system to show all possible solutions.

c) Write one possible solution to the problem.

(GRAPH ATTACHED)

Many solutions!

2 fg & 1 free throw

2 fg & 2 free throws

4 fg & 2 free throws ...

6. Suppose you need to use at least \$1.00 worth of stamps to mail a package. You have as many \$0.03 stamps as you need but only four \$0.32 stamps. How many of each stamp can she buy?

a) Write a system of two inequalities that describes this situation.

x : # of 3¢ stamps

y : # of 32¢ stamps

$$.03x + .32y \geq 1 \quad \leftarrow \text{Money needed}$$

$$y \leq 4$$

\leftarrow only have four 32¢ stamps

b) Graph the system to show all possible solutions.

c) Write one possible solution to the problem.

15 three cent stamps & 2 thirty-two cent stamps
 40 three cent stamps & 0 thirty-two cent stamps
 ↪ and many more...

*7. A grandmother wants to spend at least \$40 but no more than \$60 on school clothes for her grandson. T-shirts sell for \$10 and pants sell for \$20. How many T-shirts and pants could she buy?

a) Write a system of two inequalities that describes this situation.

x : # of t-shirts

y : # of pants

$$10x + 20y \geq 40 \quad \leftarrow \text{minimum to spend}$$

$$10x + 20y \leq 60 \quad \leftarrow \text{maximum to spend}$$

b) Graph the system to show all possible solutions.

c) Write one possible solution to the problem.

0 shirts & 2 pants

2 shirts & 1 pant

4 shirts & 0 pants

5 shirts & 0 pants

8. Dwight Howard of the Houston Rockets has played in 33 game this season. In those 33 games he has made no three-point baskets. Therefore, all his points have come on two-point shows and free-throws. In each game he has made as least four shots, including free throws. Also, he has scored less than 27 points in each game. Graph the system of inequalities to show all possible solutions.

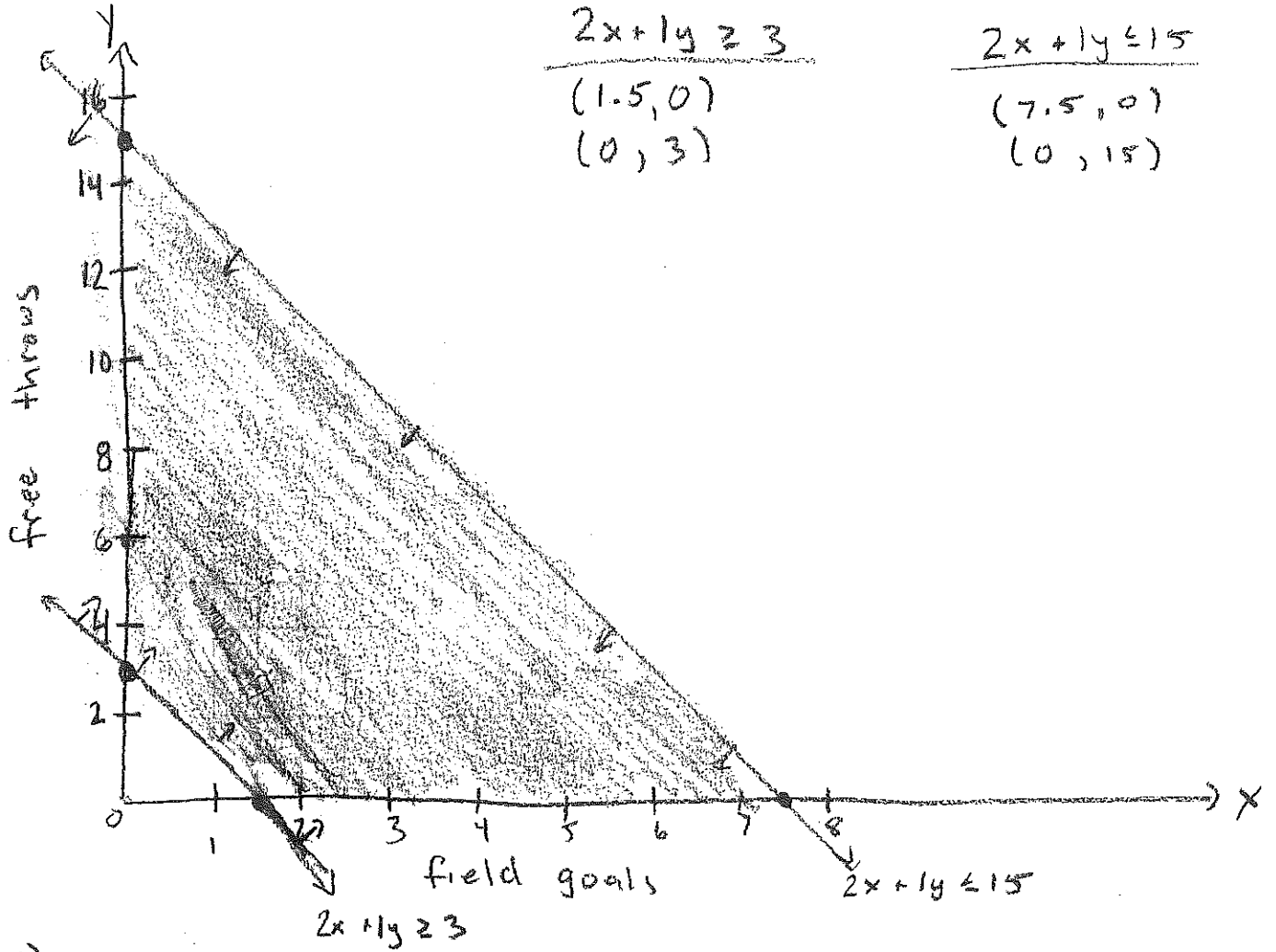
x : # field goals (2 pts)

y : # of free throws (1 pt)

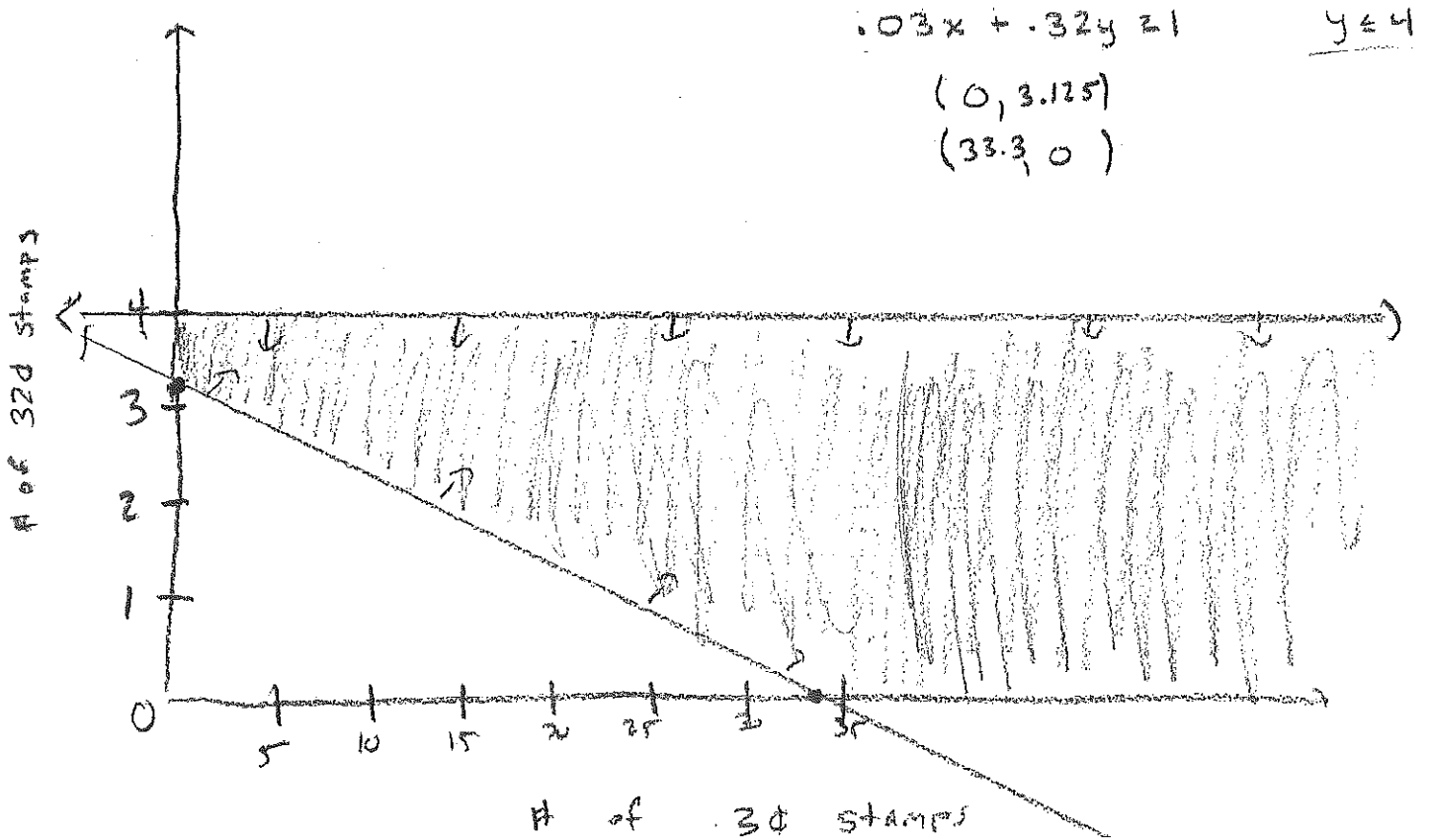
$$x + y \geq 4 \quad \leftarrow \text{at least 4 shots}$$

$$2x + 1y < 27 \quad \leftarrow \text{points}$$

#5)



#6)



$$10x + 20y \geq 40$$

$$(4, 0) (0, 2)$$

$$10x + 20y \leq 60$$

$$(6, 0) (0, 3)$$

