

Key

Systems of Inequalities

WORD PROBLEMS

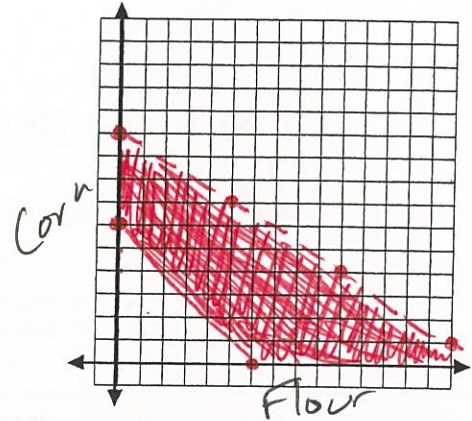
1. Suppose you buy flour and cornmeal in bulk to make flour tortillas and corn tortillas. Flour costs \$1.50 per pound and cornmeal costs \$2.50 per pound. You want to spend less than \$25 on flour and cornmeal, but you need at least 6 pounds altogether.

a. Write and graph a system of linear inequalities:

$$\frac{2.50y < -1.50x + 25}{2.50} \\ y < -0.6x + 10$$

$$1.50x + 2.50y < 25$$

$$x + y \geq 6 \quad y \geq -x + 6$$



b. Write two possible solutions:

i. (6, 3) 6 Flour 3 Corn

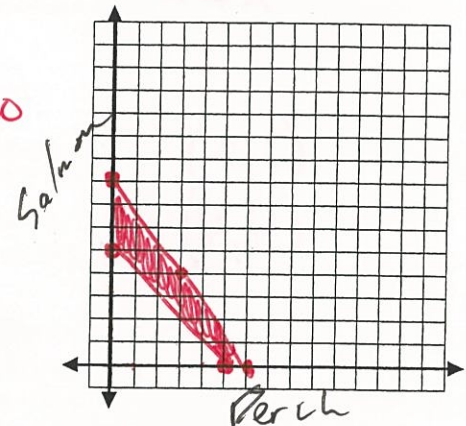
ii. (2, 7) 2 Flour 7 Corn

2. A seafood restaurant owner orders perch and salmon. Perch is \$4/lb and salmon is \$3/lb. He wants to buy at least 50 pounds of fish but cannot spend more than \$240.

a. Write and graph a system of linear inequalities:

$$4x + 3y \leq 240 \\ 3y \leq -4x + 240 \\ y \leq -\frac{4}{3}x + 80$$

$$x + y \geq 50 \quad y \geq -x + 50$$



b. Write two possible solutions:

i. (10, 50) 10 Perch 50 salmon

ii. (30, 30) 30 Perch 30 salmon

3. The "We Sell CDs" website plans to purchase ads in a local newspaper to advertise their site. Their operating budget will allow them to spend at most \$3000 on this advertising adventure. An ad will cost \$30 to appear in the weekday paper and \$50 to appear in the weekend edition. They plan to run at least 20 ads.

a. Write and graph a system of linear inequalities:

$$30x + 50y \leq 3000 \quad 30x + 50y \leq 3000$$

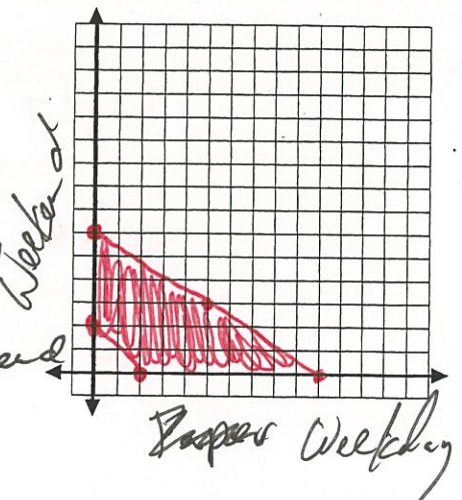
$$50y \leq -30x + 3000$$

$$y \leq -\frac{30x}{50} + 60 \quad x + y \geq 20 \quad y \geq -x + 20$$

b. Write two possible solutions:

i. (30, 20) 30 Weekday 20 Weekend

ii. (60, 10) 60 Weekday 10 Weekend



4. Mary knits scarves and sweaters to sell. Scarves take 2 hours to knit and sweaters take 10 hours. Mary would like to spend no more than 40 hours per week knitting and knit at least 5 items per week.

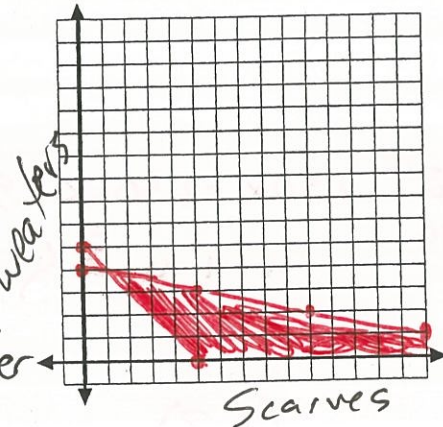
a. Write and graph a system of linear inequalities:

$$\begin{aligned} 10y &\leq -2x + 40 \\ y &\leq -\frac{1}{5}x + 4 \end{aligned} \quad \underline{2x + 10y \leq 40}$$

$$\underline{x + y \geq 5} \quad y \geq -x + 5$$

b. Write two possible solutions:

- i. (6, 1) 6 scarves 1 sweater
- ii. (10, 1) 10 scarves 1 sweater



5. A clothing store has a going-out-of-business sale. They are selling pants for \$8.99 and shirts for \$3.99. You can spend as much as \$60 and want to buy at least two pairs of pants.

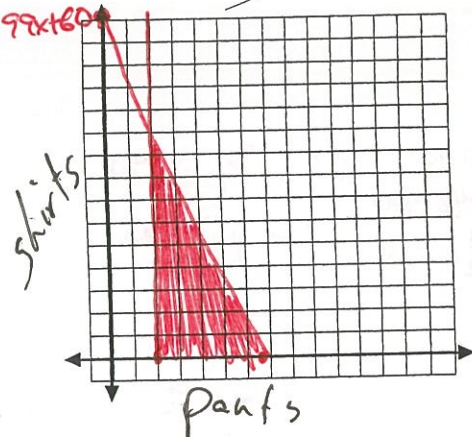
a. Write and graph a system of linear inequalities:

$$\underline{8.99x + 3.99y \leq 60} \quad 3.99y \leq -8.99x + 60$$

$$\underline{x \geq 2} \quad y \leq$$

b. Write two possible solutions:

- i. (3, 2) 3 pants 2 shirts
- ii. (4, 4) 4 pants 4 shirts



6. You'd like to see how many baseball and soccer games you can attend this spring. Travel time for baseball games is 2 hours and soccer games is 1 hour. You would like to spend no more than 15 hours traveling to the games. In total, you would like to attend at least 8 games.

a. Write and graph a system of linear inequalities:

$$\underline{2x + y \leq 15} \quad y \leq -2x + 15$$

$$\underline{x + y \geq 8} \quad y \geq -x + 8$$

c. Suppose we decide on attending 4 baseball games, what is the range of soccer games you can attend?

$$4 \leq y \leq 7$$

d. Suppose we decide on attending 9 soccer games, what is the range of baseball games you can attend?

$$0 \leq x \leq 3$$

e. Is it possible to attend 6 baseball games and 4 soccer games?

No

$$\begin{aligned} 12 + 4 &\leq 15 \\ 16 &\leq 15 \text{ false} \end{aligned}$$

