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.

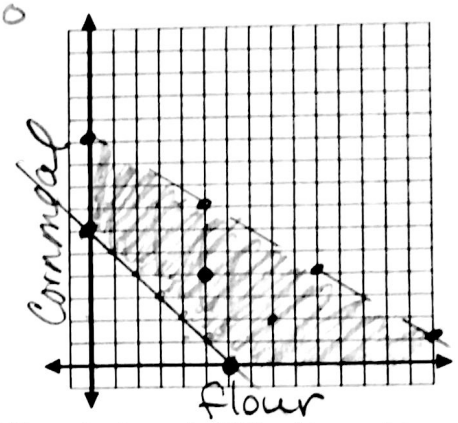
a. Write and graph a system of linear inequalities:

x = flour
y = cornmeal

$1.50x + 2.50y < 25 \rightarrow y < -\frac{3}{5}x + 10$

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

$0 \geq 6$



b. Write two possible solutions:

i. 5 lbs of flour, 4 lbs of cornmeal

ii. 8 lbs of flour, 2 lbs of cornmeal

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.

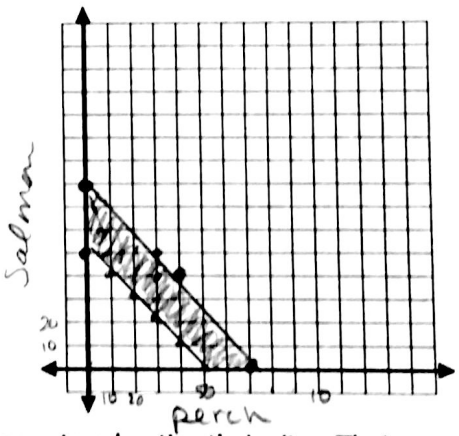
a. Write and graph a system of linear inequalities:

x = perch
y = salmon

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

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

$0 \geq 50$



b. Write two possible solutions:

i. 30 lbs of perch, 40 lbs of salmon

ii. 30 lbs of perch, 10 lbs of 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:

x = weekday
y = weekend

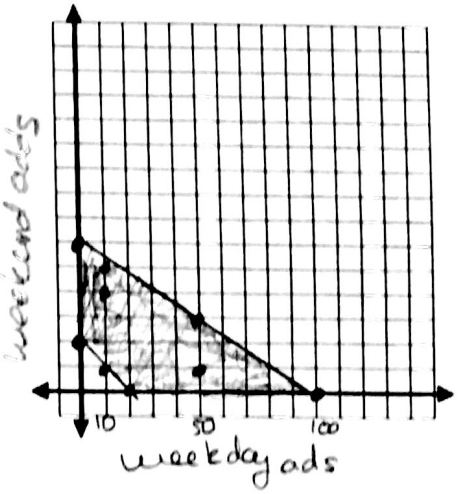
$30x + 50y \leq 3000 \quad y \leq -\frac{3}{5}x + 60$

$x + y \geq 20 \rightarrow y \geq -x + 20$

b. Write two possible solutions:

i. 50 weekday ads, 10 weekend ads

ii. 10 weekday ads, 50 weekend ads



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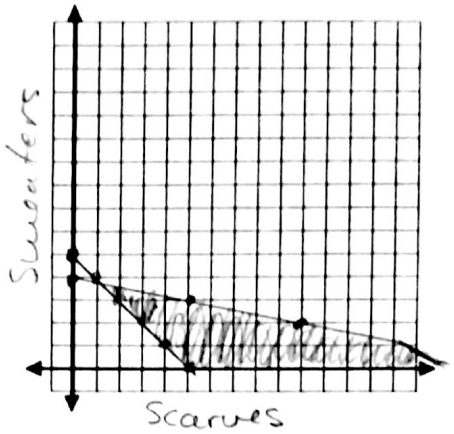
4. Mary knits scarves and sweaters to sell. Scarves take 2 hours to knit and sweaters take 10 hours. Mary would like to spend no more than 40 hours per week knitting and knit at least 5 items per week.

x = scarves
y = sweaters

a. Write and graph a system of linear inequalities:

$2x + 10y \leq 40 \rightarrow y \leq -\frac{1}{5}x + 4$

$x + y \geq 5 \rightarrow y \geq -x + 5$



b. Write two possible solutions:

i. 3 scarves, 3 sweaters

ii. 10 scarves, 1 sweater

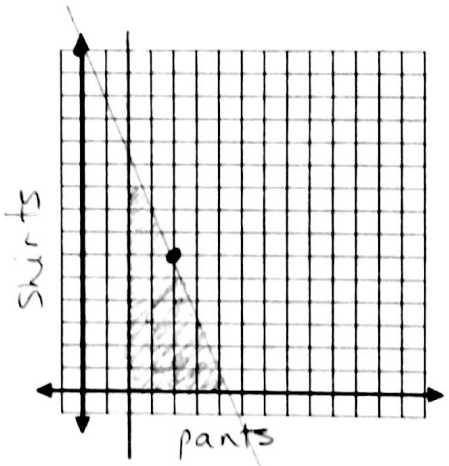
5. A clothing store has a going-out-of business sale. They are selling pants for $8.99 and shirts for $3.99. You can spend as much as $60 and want to buy at least two pairs of pants.

x = pants
y = shirts

a. Write and graph a system of linear inequalities:

$9x + 4y \leq 60 \rightarrow y \leq -\frac{9}{4}y + 15$

$x \geq 2$



b. Write two possible solutions:

i. 4 pants, 3 shirts

ii. 5 pants, 2 shirts

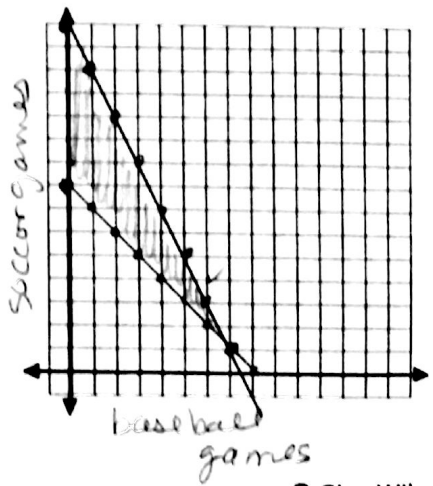
6. You'd like to see how many baseball and soccer games you can attend this spring. Travel time for baseball games is 2 hours and soccer games is 1 hour. You would like to spend no more than 15 hours traveling to the games. In total, you would like to attend at least 8 games.

y = soccer
x = baseball

a. Write and graph a system of linear inequalities:

$2x + y \leq 15 \rightarrow y \leq -2x + 15$

$x + y \geq 8 \rightarrow y \geq -x + 8$



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? (6, 4)

No! (6, 4) is outside the shaded region.