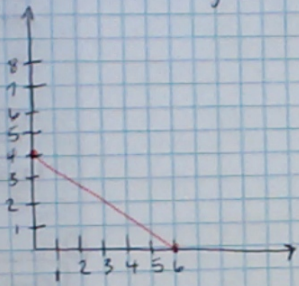


$$2x + 3y = 12$$

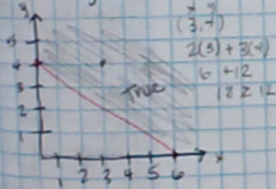


Intercept

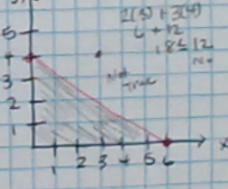
$$\begin{aligned} \text{x-int} \\ 2x + 3(0) &= 12 \\ 2x &= 12 \\ \frac{2x}{2} &= \frac{12}{2} \\ x &= 6 \\ (6, 0) \end{aligned}$$

$$\begin{aligned} \text{y-int} \\ 2(0) + 3y &= 12 \\ 3y &= 12 \\ \frac{3y}{3} &= \frac{12}{3} \\ y &= 4 \\ (0, 4) \end{aligned}$$

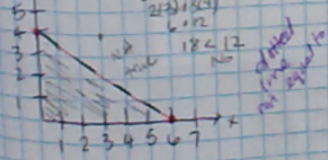
$$2x + 3y \geq 12$$



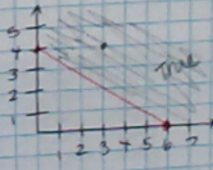
$$2x + 3y \leq 12$$



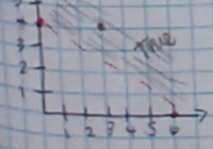
$$2x + 3y < 12$$



$$2x + 3y > 12$$



$$2x + 3y \geq 12$$



5.5 Continued

SECONDARY MATH I (MODEL 1)
SYSTEMS OF EQUATIONS AND INEQUALITIES

5.5 All For One, One For All



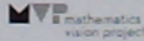
A Solidify Understanding Task

Carlos and Clarita have found a way to represent combinations of cats and dogs that satisfy each of their individual "Pet Sitter" constraints, but they realize that they need to find combinations that satisfy all of the constraints simultaneously. Why?

Do the following in your notebook. Make it so you can see your work and this handout.

1. Begin by listing the systems of inequalities you have written to represent the start-up costs and space "Pet Sitter" constraints.
2. Find at least 3 combinations of cats and dogs that would satisfy both of the constraints represented by this system of inequalities. How do you know these combinations work?
3. Find at least 5 combinations of cats and dogs that would satisfy one of the constraints, but not the other. For each combination, explain how you know it works for one of the inequalities, but not for the other?
4. Shade a region on the coordinate grid that would represent the solution set to the system of inequalities. Explain how you found the region to shade.
5. Rewrite your systems of inequalities to include the additional constraints for feeding time and pampering time.
6. Find at least 5 combinations of cats and dogs that would satisfy all of the constraints represented by this new system of inequalities. How do you know these combinations work?
7. Find at least 5 combinations of cats and dogs that would satisfy some of the constraints, but not all of them. For each combination, explain how you know it works for some inequalities, but not for others?
8. Shade a region of the coordinate grid that would represent the solution set to the system of inequalities consisting of all 4 "Pet Sitter" constraints. Explain how you found the region to shade.
9. Shade a region in quadrant I of the coordinate grid that would represent all possible combinations of cats and dogs that satisfy the 4 "Pet Sitter" constraints. This set of points is referred to as the feasible region since Carlos and Clarita can feasibly board any of the combinations of cats and dogs represented by the points in this region without exceeding any of their constraints on time, money or space.
10. How is the feasible region shaded in #9 different from the solution set to the system of inequalities shaded in #8?

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① System of Inequalities
Space

$$6x + 24y \leq 360$$

cats dogs

Cost

$$32x + 80y \leq 1200$$

cats dogs

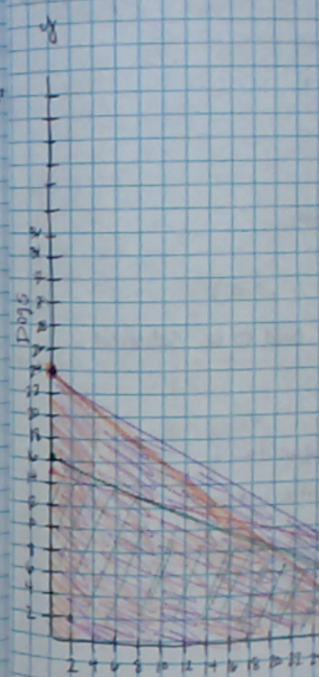
②

Feeding

$$12x + 20y \leq 480$$

Pampering

$$16x + 20y \leq 480$$



②

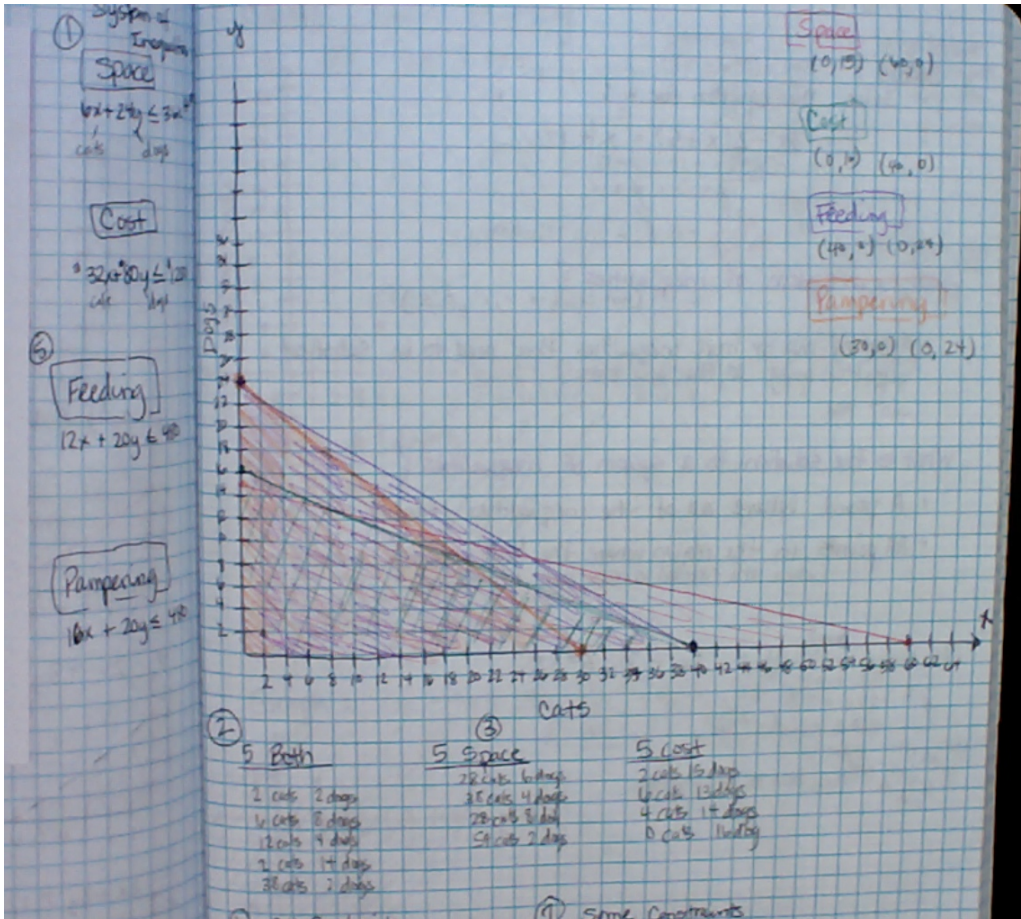
5 Both

- 2 cats, 2 dogs
- 4 cats, 8 dogs
- 12 cats, 9 dogs
- 2 cats, 14 dogs
- 20 cats, 2 dogs

③

5 Space

- 28 cats
- 25 cats
- 28 cats
- 30 cats



- ②
- 5 Bath**
- 2 cats 2 days
 - 1 cat 8 days
 - 12 cats 4 days
 - 2 cats 14 days
 - 38 cats 2 days
- 5 Space**
- 28 cats 6 days
 - 35 cats 4 days
 - 28 cats 8 days
 - 51 cats 2 days
- 5 Cost**
- 2 cats 15 days
 - 16 cats 13 days
 - 4 cats 14 days
 - 0 cats 14 days

