Pet Sitters Revisited

A Develop Understanding Task

Carlos and Clarita have successfully found a way to represent *all* of the combinations of cats and dogs that they can board based on *all* of the following constraints.

- *Space*: Cat pens will require 6 ft^2 of space, while dog runs require 24 ft^2. Carlos and Clarita have up to 360 ft^2 available in the storage shed for pens and runs, while still leaving enough room to move around the cages.

- *Feeding Time*: Carlos and Clarita estimate that cats will require 6 minutes twice a day—morning and evening—to feed and clean their litter boxes, for a total of 12 minutes per day for each cat. Dogs will require 10 minutes twice a day to feed and walk, for a total of 20 minutes per day for each dog. Carlos can spend up to 8 hours each day for the morning and evening feedings, but needs the middle of the day off for baseball practice and games.

- *Pampering Time*: The twins plan to spend 16 minutes each day brushing and petting each cat, and 20 minutes each day bathing or playing with each dog. Clarita needs time off in the morning for swim team and evening for her art class, but she can spend up to 8 hours during the middle of the day to pamper and play with the pets.

- *Start-up Costs*: Carlos and Clarita plan to invest much of the $1280 they earned from their last business venture to purchase cat pens and dog runs. It will cost $32 for each cat pen and $80 for each dog run.

Now they are trying to determine how many of each type of pet they should plan to accommodate. Of course, Carlos and Clarita want to make as much money as possible from their business, so they need to pay attention to both their daily income as well as their daily costs. They plan to charge $8 per day for boarding each cat and $20 per day for each dog. They estimate that each cat will require $2.00 per day in food and supplies, and that each dog will require $4.00 per day in costs.

After surveying the community regarding the pet boarding needs, Carlos and Clarita are confident that they can keep all of their boarding spaces filled for the summer.

So the question is, how many of each type of pet should they prepare for in order to make as much money as possible?

What combination of cats and dogs do you think will make the most money? What recommendations would you give to Carlos and Clarita, and what argument would you use to convince them that your recommendation is reasonable?

To get started on this task, you might want to look for collections of points where the daily profit is the same. For example, can you find a collection of points where for each point the daily profit is $120? What about $180?