Here's the Situation:

Harry and Hermoine need to make some extra money while Hogwarts is on summer break. They decide that they will use the extra space at Hermoine's family home to board pets for people who will be going away on vacation and can't bring their pets with them.

Since most Muggles have boring pets like cats and dogs that is what Harry and Hermoine will focus on. They learn that a cat requires 2 m^2 of space and a dog requires 5 m^2 to be comfortable. Hermoine's backyard has a total area of 150 m^2 to work with. And, she is allowed to use all of that area.

Harry and Hermoine have pooled their money and have $1500 to get this new business going. To construct a cat pen will cost $32 while a dog run will cost $80.

There are lots of cats and dogs to keep their business full. Harry and Hermoine think that the community will pay $8 for a cat and $20 for a dog per day of boarding. This will include care and food for the animals.

All you work that you do must include the math to work it out - and graphs. Labelled and appropriate for the questions.

Hermoine's Dad thinks they should focus on cats as they take less room. Hermoine thinks focussing on dogs is the better plan as they pay more. Harry can't decide so he thinks an even number of each will be fine.
→ What number of animals should they choose in order to maximize profit?
Show me a graph that represents their start up cost constraint as it relates to building the animal pens.
Show me a graph that represents the space constraint. (they can't make a million cages!)

Think about other considerations on keeping the animals. Do some take more time to care for? Are there health concerns? What else should they be thinking about before they start this business?

Your conclusion should be to tell me how many dogs and cats they should board to mazimize their profit.

Part 2

You need to find another situation like Harry and Hermoine's, and solve it. It should be based in the real world. Use the internet or your personal experience to find a situation that can be modelled by a system of linear inequalities. You will define the situation and do the math to show the best possible result.