Two Complete Problems

- Lemonade Stand
- Farmer problem

Problem 1: Lemonade

A school club is planning to sell lemonade and lemon slushies as a fundraiser. Because it is a hot day, they will both sell out.

Lemonade requires 1 cup of ice per serving and 3 tablespoons of lemonade powder.

Slushies require 2 cups of ice and 2 tablespoons powder.

The club has three 20-pound bags of ice (about 120 cups total), and 3 quarts of lemonade powder (about 192 tbsp).

If slushies will sell for $4 and lemonades for $3, maximize the club's profit. Report the answer in words and include commentary on active and inactive constraints if there are any.

Problem 2: Farmer

A farmer raises cows, chickens, pigs and goats.

He has 600 m^2 of farmyard space; each chicken requires $1m^2$, goats and pigs $2m^2$ each, and cows $4m^2$.

He can afford $1200/week on food; each cow costs $10/week, chickens and pigs $2, goats $1.

Medical care for his animals averages $5/month per cow, $2 per pig and goat, and $0 per chicken. His veterinary contract provides care up to $800/month.

His expected annual profit is $350 per cow, $40 per pig, $35 per goat, and $10 per chicken. Maximize this profit.

Write your solution completely and in context.