Spring 2022 Pre-calculus Lesson 12.5

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do now

be sure to: Get out your **binder**. Copy **goal** and answer **do now** questions below. Show all work or write a complete sentence for each answer:

1. Carefully read the paragraph to the right, bulleting key info in your notes.
2. How could you represent the key info as a **table**?
3. What do you think you will optimize for in this problem?

A farmer feeds his cows a feed mix to supplement their foraging. The farmer uses two types of feed for the mix. Corn feed contains 100 g protein per kg and 750 g starch per kg. Wheat feed contains 150 g protein per kg and 700 g starch per kg. Each cow should be fed at most 7 kg of feed per day. The farmer would like each cow to receive at least 650 g protein and 4000 g starch per day. If corn feed costs $0.40/kg and wheat costs $0.45/kg, then what is the optimal feed mix that minimizes cost? Round your answers to the nearest gram.

class: pre-calculus **goal:** HDW use graphs to find the optimal solution for a problem with 3+ constraints?

framing

- **what:** use graphical method to find the optimal solution for a problem with at least 3 constraints?
- **why:** this is an extension of what we were doing earlier in the week with two constraints
- **where to:** linear optimization with more than two variables

class: pre-calculus **goal:** HDW use graphs to find the optimal solution for a problem with 3+ constraints?

Vocabulary

Decision variable (linear programming)
Represents the unknown quantities we are trying to optimize

Constraint (linear programming)
A restriction on the decision variables. Represented as an inequality.

be sure to:

1. Identify the constraints and decision variables you'll be using for this problem
2. Use Desmos graphing calculator to find the **feasible region**
3. Describe the feasible region in a sentence, including its shape (quadrilateral, pentagon), and vertices
4. Use the graphical method to sole to solve the problem.

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Constraint
A restriction on the decision variables. Represented as an inequality.

Decision variable
Represents the unknown quantities we are trying to optimize

Feasible region
The part of a graph that satisfies all the constraints for an optimization problem

Graphical method
The optimal solution for a problem is always one of the vertices of the feasible region

class: pre-calculus **goal:** HDW use graphs to find the optimal solution for a problem with 3+ constraints?

Reflection

1. **How is the graphical method different from the algorithm we learned before break? How is it similar?**

2. **Why is the graphical method useful?**

3. **What lingering questions do you have about the graphical method?**