

KEY CONCEPTS

Techniques for connecting

- **Objective function**: This is the formula you're trying to optimize. For example, if you want to maximize profit, this function might be something like Profit = 5x + 3y, where x and y are the variables you can control.
- Constraints: These are the rules or limitations you have to follow. For instance, you might only have a limited amount of resources or time. These are expressed as inequalities, like x + y ≤ 10 (you can't use more than 10 units of resources).
- **Feasible region**: This is the area on a graph where all the constraints overlap, meaning it's the set of possible solutions that meet all the rules. The optimal solution will be a point within this region.

EXAMPLE

Simple Business Use Case

Let's say you run a bakery and you sell cakes and cookies. You make \$5 from each cake and \$3 from each cookie. However, you only have 8 hours to bake, and each cake takes 2 hours while each cookie takes 1 hour. You also have only 10 units of flour, and cakes use 3 units of flour while cookies use 1 unit.

USE CASES ARE EVERYWHERE!

- 1. Production Planning in Manufacturing
- 2. Workforce Scheduling
- 3. Supply Chain Optimization
- 4. Investment Portfolio Optimization
- 5. Marketing Budget Allocation
- 6. Can you think of any more?

BLUF IN 3 QUESTIONS

Ask these three questions:

1.Is there an objective?

• Are you trying to **maximize** something (e.g., profit, sales) or **minimize** something (e.g., cost, time)?

2. Are there decision variables?

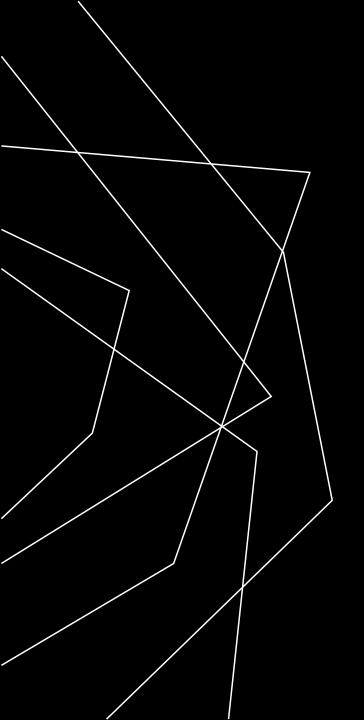
• Are there things you can control or adjust (e.g., how much to produce, how many employees to schedule)?

3.Are there constraints?

• Are there limits or restrictions (e.g., budget, resources, time) that affect how the decision variables can change?

If the answer to all three is yes, it's likely a linear optimization use case, and the business value lies in finding the best solution within those constraints to achieve the objective.





THANK YOU! - QUESTIONS?

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