Chapters 1 & 2

INTRO TO LINEAR PROGRAMMING —**THE 7 STEPS**

The Big Plan

Over the next few weeks, I will go over the steps in more detail. Watch the videos, PAUSE and REPLAY as many times as you need, copy the notes and practice the questions assigned at the end of each video.

May 25-29:

- Intro to Linear Programming (this video)
- Detail: steps 1 and 2
- Detail: step 3

June 1-5:

- Detail: steps 4 and 5

June 8-12:

- Detail: steps 6 and 7

June 15-19

- Putting it all Together (Steps 1-7)

The 7 Steps

1. Define the variables (x and y).
2. Decide if it is a "Real-Life Situation", if yes, add $x \geq 0, y \geq 0$.
3. Translate the word problem into inequalities. (REMEMBER: "Number Of", "Cost" and "Proportion" Inequalities)
4. Graph the inequalities on a Cartesian Plane to form the polygon of constraints.

5. Find/calculate the vertices (graphically, comparison, substitution, or elimination)
6. Determine the objective rule and complete the table.
7. Choose the best answer and write a summary statement.

Example: Prom Shop

- **Steps 1 & 2:** A Prom Shop on St. Zotique street sells two types of dresses for prom, "Off the Rack" and "Made to Measure".
- **Steps 3, 4 & 5:** The prom shop can produce a maximum of 54 dresses per week during peak season. They must sell a minimum of 36 dresses per week. They must sell more than12 "Off the Rack" dresses. They can produce at most 30 "Made to Measure" dresses. They must sell at least the same amount of "Made to Measure" dresses as "Off the Rack" dresses.
- **Steps 6 & 7:** They make a profit of 50$ on "Off the Rack" dresses and a profit of 30$ on "Made to Measure" dresses. How many of each type of dress must the Prom Shop sell to maximize profits?

Solution:

1. Define the variables.
   - x = number of "Off the Rack" dresses
   - y = number of "Made to Measure" dresses
2. Decide if it is a "Real-Life Situation", if yes, add $x \geq 0, y \geq 0$.
   - Yes, it is a "Real-Life Situation" because you can only sell zero or a positive number of dresses, you can't sell negative dresses.

3. Translate the word problem into inequalities. (REMEMBER: "Number Of", "Cost" and "Proportion" Inequalities)

- The prom shop can produce a maximum of 54 dresses per week during peak season.

$$x + y \leq 54$$

- They must sell a minimum of 36 dresses per week.

$$x + y \geq 36$$

- They must sell more than12 "Off the Rack" dresses.

$$x > 12$$

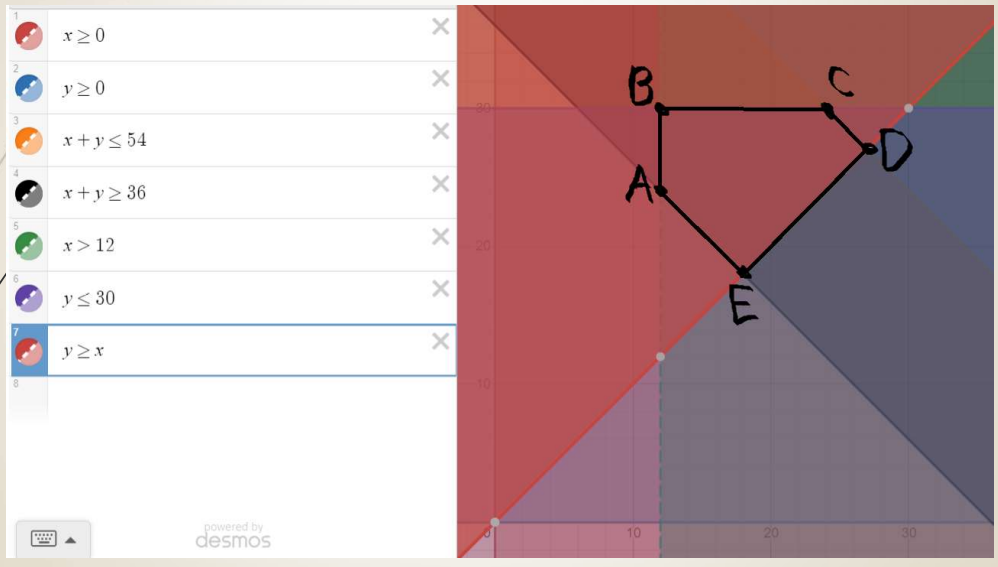
- They can produce at most 30 "Made to Measure" dresses.

$$y \leq 30$$

- They must sell at least the same amount of "Made to Measure" dresses as "Off the Rack" dresses.

$$y \geq x$$

4. Graph the inequalities on a Cartesian Plane to form the polygon of constraints.



5. Find/calculate the vertices (graphically, comparison, substitution, or elimination)

- Vertex A $x = 12 \; and \; x + y = 36$ Substitution (12, 24)
- Vertex B $x = 12 \; and \; y = 30$ Graphically (read off graph) (12, 30)
- Vertex C $y = 30 \; and \; x + y = 54$ Substitution (24, 30)
- Vertex D $y = x \; and \; x + y = 54$ Substitution (27, 27)
- Vertex E $x = 12 \; and \; y = x$ Graphically (12, 12)

6. Determine the objective rule and complete the table.

- They make a profit of 50$ on "Off the Rack" dresses and a profit of 30$ on "Made to Measure" dresses.

Point	Ordered Pair	Objective Rule	Result
		P= 50x +30y	
A	(12, 24)	50(12) +30(24)	1320$
B	(12, 30)	50(12) +30(30)	1500$
C	(24, 30)	50(24) +30(30)	2100$
D	(27, 27)	50(27) +30(27)	2160$
E	(12, 12)	50(12) +30(12)	960$

7. Choose the best answer and write a summary statement.

- The Prom Shop must…sell 27 "Off the Rack" and 27 "Made to Measure" dresses to maximize profits (2160$).

Homework/Classwork

- Go to the next video…no homework for this video.