Steps 6 & 7~Finding the Optimal Value and Summary Statement

Chapter 2

STEPS 6 & 7…last ones!

1. Define the variables.
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: "Real-Life", "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.**

Optimal Solutions

Finding the BEST answer that follows all the "rules" at the same time. There are many "answers" available.

Best means:

maximize—biggest profit

minimize—lowest cost

- **Objective Rule**: an equation that describes the goal of the person/company…usually minimizing cost or maximizing profit

STEP 6

a) Define the objective rule. (Generally, the objective rule is at the end of the problem and is an equation (profit or cost).)

b) Draw and complete a table (see sample below)

c) Decide which point(s) maximize or minimize the objective rule.

Point	Ordered Pair	Objective Rule	Result
		P= 70x +85y	
A			
B			
C			

STEP 7

a) Write a summary statement.

SPECIAL NOTE:

Sometimes there is more than one solution (**several vertices**, or an **entire edge** of the polygon of constraints—you must check the edge yourself—all the "pretty points"—ADD THEM TO YOUR TABLE AND CALCULATE)

Example: Vitrex Windows

Question:

Vitrex specializes in manufacturing both summer and winter windows. A summer window consists of a pane of glass and a screen while a winter window consists of two panes of glass spaced several millimetres apart. To meet demand, Vitrex has to manufacture at least 10 summer windows and 30 winter windows per week. The company can make no more than 100 windows in one week. The profit on a summer window is $70 and the profit on a winter window is $85.

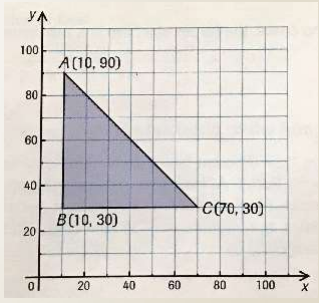
Step 1:

If x represents the number of summer windows and y the number of winter windows, we obtain the following system of inequalities:

Steps 2 & 3:

$$x \geq 0$$
$$y \geq 0$$
$$x \geq 10$$
$$y \geq 30$$
$$x + y \leq 100$$

Steps 4 & 5:



Step 6:

$$P\ (profit) = 70x + 85y$$

Point	Ordered Pair	Objective Rule	Result
		P= 70x +85y	
A	(10, 90)	$70(10) + 85(90)$	$8350
B	(10, 30)	$70(10) + 85(30)$	$3250
C	(70, 30)	$70(70) + 85(30)$	$7450

Profit is maximizing, so…the maximum profit is $8350.

Step 7:

Vitrex must sell 10 summer windows (at $70 profit each) and 90 winter windows (at $85 profit each) to get the most profit ($8350).

Classwork/Homework

- MHS Worksheet "Chapter 2—Finding the Optimal Value" #1-10