

MTH245 Homework 6

First, solve the following three problems using Solver in Excel, and yes, you should get the same solutions as you got when you did these problems by hand!

1. Maximize $P = 3x + 4y$, subject to:

$$\begin{aligned} x + 2y &\leq 50 \\ 5x + 4y &\leq 145 \\ 2x + y &\geq 25 \\ x, y &\geq 0 \end{aligned}$$

2. Minimize $C = 10x + 15y$, subject to:

$$\begin{aligned} x + y &\geq 10 \\ 3x + y &\geq 12 \\ -2x + 3y &\geq 3 \\ x, y &\geq 0 \end{aligned}$$

3. Jumbo Java sells two different coffee blends: House blend and Gourmet blend. The House blend is 90% Antigua and 10% Kona and it sells for \$10 a pound while the Gourmet blend is 80% Antigua and 20% Kona, and it sells for \$11 a pound. Jumbo Java has a limited amount of Antigua and Kona beans on hand. How many pounds of the two blends should they mix to maximize revenue if they have 72 pounds of Antigua beans and 10 pounds of Kona on hand?

Now, some new questions:

4. Outdoor Elegance handcrafts furniture from organically grown willow branches and finishes them with rubbed beeswax. They craft chairs, rockers and tables and each requires a set amount of time for manufacture and finishing. The time required for each step and the profit per item is given in the table below. Find the best mix for the number of chairs, rockers and tables to make in order to maximize profit, subject to the manufacturing and finishing constraints. *(Note, this problem involves more than two variables and would not be solvable using a graph.)*

Time Required per:	Manufacturing	Finishing	Profit
Chair	12 min	10 min	\$20
Rocker	15 min	10 min	\$10
Table	15 min	10 min	\$22.50
Available	10 hours	7 hours	

5. Run a Sensitivity Report on the Jumbo Java problem and explain what

- a. The Allowable Increase and Decrease on the Objective Coefficients tell us.
- b. What the Shadow Prices for the constraints tell us.