Homework 2

Feel free to use a solver to validate your solutions, but it is not necessary (nor a sufficient justification for problem 3). The homework will be due Friday 10/21/2022 by 11:59pm as the solutions will be posted on the following day. Good luck.

1. Min $-2x_1 - x_2$
   such that
   $x_1 - x_2 \leq 2$
   $x_1 + x_2 \leq 6$
   $x_1, x_2 \geq 0$

   a) Solve using the simplex method.
   b) Solve using the graphical method.

2. Min $2x_1 + 3x_2$
   such that
   $2x_1 + x_2 \leq 600$
   $x_1 + x_2 \geq 350$
   $x_1 \geq 125$
   $x_1, x_2 \geq 0$

   a) Solve using the simplex method.
   b) Solve using the graphical method.

3. For the following justify all answers using the sensitivity analysis. For each change indicated state whether the optimal production levels stay the same or change and the new objective function value given the stated change. If any of the changes cannot be calculated with the given information indicate that the Linear Program must be resolved before answering. Show all work.

Max 63E + 95S + 135D

Such that:

1E +	1S +	1D ≤ 200	Fan Motors
1E +	2S +	4D ≤ 320	Cooling Coils
8E +	12S +	14D ≤ 2400	Hours

E,S,D ≥ 0

Name	Final Value	Reduced Cost	Coefficient	Min_ Coef	Max_ Coef
Economy	80	0	63	47.5	75
Standard	120	0	95	87	126
Deluxe	0	-24	135	-Inf	159

Name	LHS	RHS	Shadow_ price	Min_ RHS	Max_ RHS
Fan Motors	200	200	31	160	280
Cooling Coils	320	320	32	200	400
Hours	2080	2400	0	2080	Inf

a.) Increase Cooling Coils by 40, Fan Motors by 40, and Hours by 500.

b.) Decrease Cooling Coils and Fan Motors by 30.

c.) Raise price of all models (Economy, Standard, and Deluxe) by $8.

d.) Decrease the price of standard by 4 and increase the price of deluxe by 12.