GBA 334 Final Exam:

1. Some educators might argue that linear programming is among the five most useful tools that can be learned in a business school. It can be used to solve very large problems with thousands of variables and constraints. Smaller problems can be solved with Excel, which is available on virtually all desktop computers with Microsoft Office or with online application tools. Good linear programming formulations represent as much of an art as a science.

A) Develop a linear program problem (max or min) with at least three constraints and three variables. (3 points)

B) Explain the meaning of the numbers on the right hand side of your constraints. (3 points)

C) Explain the significance of the coefficients in your objective function. (3 points)

D) Solve your problem graphically and show the critical region along with the corner points. Indicate the value of the objective function at each corner point. Identify which corner point is optimal. (5 points)

E) Explain the meaning of your solution. (3 points)

F) Increase the value of your first variable in your objective function by 60%. Does this change your optimal solution? Explain why the increase did or did not change your optimal solution. (3 points)

2. St. Mary's hospital is a medium sized hospital in Newport News, VA. St. Mary began a new process to make sure patients receive the hottest meals possible. St. Mary food service manager plans to deliver meals in bulk to three recently installed serving stations in the hospital. From the serving stations, the food will be reheated, and meals will be placed on individual trays, placed on a cart, and served to the patients on the different floors and wings of the hospital.

The three serving stations have been strategically placed throughout the hospital for optimal efficiency. The table below presents the location name and the meal capacity at each location.

Station Location	Meal Capacity
SL1	225
SL2	225
SL3	250

Saint Mary's hospital has six wings with the number of patients each as follows:

	Wing 1	Wing 2	Wing 3	Wing 4	Wing 5	Wing 6
Patients	100	100	150	200	70	80

St Mary's Hospital wants to increase the temperature of the meals served to patients. Thus, the amount of time needed to deliver a tray from a serving station to a patient determines the proper distribution of food to each wing. The time associated with each possible distribution from station to wing is listed in the table below.

Delivery Time in Minutes						
To: From:	Wing 1	Wing 2	Wing 3	Wing 4	Wing 5	Wing 6
5A	12	11	8	9	9	6
3G	6	12	7	7	5	8
1S	8	9	6	6	7	9

What is your recommendation for handling the distribution of trays from the three serving stations? (Show all work for maximum credit)

3. Betty's custom design shop is adding a new product line. However her work area must be redesigned to meet her needs. A number of activities must be accomplished to complete the redesign of the work area. The table below lists the activities about her project:

ACTIVITY	IMMEDIATE PREDECESSOR	TIME (WEEKS)
A	-	3
B	-	4
C	A	6
D	B	2
E	A	5
F	C	2
G	D,E	4
H	F,G	5

How long will it take her to complete the project and what is the critical path?