**The Task:**

Each group will choose two problems to do complete that are related to your SLC. When finished constructing your system of inequalities and constraints, representatives from each small group working on the same problem will come together to discuss their approach and confer. Students will then return to their smaller group to complete their solution and prepare their presentation.

This project will count as a test grade for the marking period. If needed, you may email me with any questions or email your rough draft.

**Grading:**

* Presentation (40 points)
  + Statement of the problem
  + Inequalities representing the constraints
  + Objective quantity equation (function you are maximizing/minimizing)
  + Graph of the feasible region
  + Explanation of the linear programming process to show how you achieved your solution
  + Statement of the solution
  + Correct use of grammar
  + Appropriate interaction with audience
* Each Problem (60 points total)
  + Clarity of the explanation of path to solution and solution (5 points)
  + Accuracy and readability of graph and functions/inequalities (10 points)
  + Mathematical efficacy (10 points)
  + Grammatical prowess (5 points)

You must choose two. Both problems are to be completed, however, only one problem will be presented.

1. (GEM) Fly-High Airlines sells business class and tourist class seats for its charter flights. To charter a plane at least 5 business class tickets must be sold and at least 9 tourist class tickets must be sold. The plane does not hold more than 30 passengers. Fly-High makes $40 profit for each business class ticket sold and $45 profit for each tourist class ticket sold. In order for Fly-High Airlines to maximize its profits, how many tourist class seats should they sell?
2. (FACE) The Plexus Dance Theatre Company will appear at the University of Georgia. According to school policy, no more than 2000 general admission tickets can be sold and no more than 4000 student tickets can be sold. It costs $0.50 per ticket to advertise the dance company to the students and $1 per ticket to advertise to the general public. The dance company has an advertising budget of $3000 for this show. Find the maximum profit the company can make if it charges $4 for a student ticket and $7 for a general admission ticket. How many student tickets should they sell?
3. (GEM) Funtime Airways flies from Palau to Nauru weekly if at least 12 first class tickets and at least 16 tourist class tickets are sold. The plane cannot carry more than 50 passengers. Funtime Airways makes $26 profit for each tourist class seat sold and $24 profit for each first class seat sold. In order for Funtime Airways to maximize its profits, how many of each type of seat should they sell? What is the maximum profit?
4. (CREW) Ms. Porter’s class is creating a low-fat pie crust recipe for his pie shop. Butter has six grams of saturated fat and one gram of polyunsaturated fat per tablespoon. Vegetable shortening has one gram of saturated fat and four grams of polyunsaturated fat per tablespoon. In the recipe, the butter and vegetable shortening will not be more than 25 tablespoons. The butter and vegetable shortening combine for at least 34 grams of saturated fat and at least 44 grams of polyunsaturated fat. Minimize the number of calories in the recipe if butter has 100 calories per tablespoon and vegetable shortening has 115 calories per tablespoon.
5. (CREW) Delores arrives at school late because her car broke down, and therefore, has only 45 minutes to complete a history exam. The exam has 2 open-ended questions and 30 multiple-choice questions. Each correct open-ended question is worth 20 points, and each multiple-choice question is worth 2 points. She knows that it usually takes her 15 minutes to answer an open-ended question and only one minute to answer a multiple-choice question. Assume that for each question Delores answers, she receives full credit. How many of each type of question should she answer to receive the maximum possible points? What are the maximum possible points that Delores can receive?
6. (GEM) S.A. Electronics manufactures portable tape players and CD players. The manufacturing plant has the capacity to manufacture at most 750 tape players and 500 CD players in one month. It takes 2 hours to make a tape player and 5 hours to make a CD player. The company can spend no more than 3000 hours manufacturing these products. S.A. Electronics makes $4 profit on tape players and $7 profit on CD players. To maximize profits, how many tape players and how many CD players should they make? What is the maximum profit?
7. (Face) Josh has 8 days to make pots and plates to sell at a local art fair.  Each pot weighs 2 pounds and each plate weighs 1 pound.  Josh cannot carry more than 50 pounds to the fair.  Each day he can make at most 5 plates and at most 3 pots.  He will make $12 profit on every plate and $25 for every pot that he sells.  How many pots and how many plates should Josh make to maximize his potential profit?

NAMEs: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Scoring Rubric: 60 possible points

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **4** | **3** | **2** | **1** |
| **Mathematical content and Accuracy**  **(10 points per problem)** | Explanation shows complete understanding of the mathematical concepts. Steps and solutions have no mathematical errors. | Explanation shows substantial understanding of the mathematical concepts. Steps and solutions fewer than 20% mathematical errors. | Explanation shows some understanding of the mathematical concepts. Steps and solutions have fewer than 30% with mathematical errors | Explanation shows some limited understanding of mathematical concepts, or is not written. Steps and solutions have greater than 30% errors |
| **Accuracy and readability of Graph**  **(10 points per problem)** | All inequalities are graphed correctly and are easy to interpret. A ruler is used to neatly connect the points or make the bars, if not using a computerized graphing program. | All inequalities are graphed correctly and are easy to see. | All inequalities are graphed correctly. | Inequalities are not graphed correctly. |
| **Clarity of the explanation of path to the solution**  **(5 points per problem)** | The work is presented in a neat, clear, organized fashion that is easy to read. | The work is presented in a neat and organized fashion that is usually easy to read. | The work is presented in an organized fashion but may be hard to read at times. | The work appears sloppy and unorganized. It is hard to know what information goes together. |
| **Grammatical prowess**  **(5 points)**  **Each** | No grammatical errors | Minor grammatical errors that do not effect understand ability | Significant grammatical errors but information can still be understood | Significant grammatical errors that make the content misunderstood |

**Presentation 40 points Possible**

**(5 points each)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **4** | **3** | **2** | **1** |
| **Statement of the problem** |  |  |  |  |
| **Inequalities representing the constraints** |  |  |  |  |
| **Objective quantity equation (function you are maximizing)** |  |  |  |  |
| **Graph of feasible region** |  |  |  |  |
| **Explanation of the linear programming process to show how you achieved your solution** |  |  |  |  |
| **Statement of the solution** |  |  |  |  |
| **Correct use of Grammar** |  |  |  |  |
| **Appropriate interaction with audience** |  |  |  |  |