Linear Optimization – Day 2 HW Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Hr\_\_\_\_\_\_\_

Senior Math

1. Olivia is a receptionist for a medical clinic. One of her tasks is to schedule appointments. She allots 20 minutes for a checkup and 40 minutes for a physical. The doctor can do no more than 6 physicals per day, and the clinic has 7 hours available for appointments. A checkup costs $55, and a physical costs $125.

a. Write an objective function and list the constraints that model the given situation.

b. Sketch a graph of the feasible region. c. How many of each appointment should Olivia make to maximize income? What is the maximum income?

2. Josh is working part-time to pay for some of his college expenses. Josh delivers pizza for $5 per hour plus tips, which run about $8 per hour, and he also tutors in the math lab for $15 per hour. The math lab is open only two hours daily, Monday through Friday, when Josh is available to tutor. Josh can work no more than 20 hours per week due to his class schedule.

a. Write an objective function and list the constraints that model the given situation.

b. Sketch a graph of the feasible region. c. How can Josh make the most money? How much is it?

3. Michelle wants to consume more nutrients. She wants to receive at least 40 mg. of calcium, 600 mg. of potassium, and 50 mg. of vitamin C. Michelle’s two favorite fruits are apples and bananas. The average nutritional content of both are given in the table below.

|  |  |  |  |
| --- | --- | --- | --- |
| **Fruit** | **Calcium** | **Potassium** | **Vitamin C** |
| **Apple** | **9.5 mg** | **158 mg** | **9 mg** |
| **Banana** | **7 mg** | **467 mg** | **11 mg** |

a. If each apple costs $0.55 and each banana costs $0.35, write an objective function. List the constraints that model the given situation.

b. Graph the feasible region. c. Determine the number of each type of fruit that Michelle should eat in order to minimize her cost while still obtaining her desired nutritional intake.

4. A batch of Mango Sunrise uses 3 liters of mango juice and 1 liter of strawberry juice. a batch of Oasis Dream uses 2 liters of mango juice and 1 liter of strawberry juice. The store has 40 liters of mango juice and 15 liters of strawberry juice that it wants to use up before the end of the day. The profit on Mango Sunrise is $16 per batch, and the profit of oasis Dream is $12 per batch.

a. Write an objective function, and list the constraints that model the given situation.

b. Graph the feasible region. c. In order to maximize profits, how many batches of each drink should the juice store make?