Name: _____

2.5.D4 – LINEAR PROGRAMMING

Past due on: _____ Period: _____

For each of the following problems:
a. Write a function to be minimized: $f(x, y)$
b. Write a system of inequalities: $x \geq 0, y \geq 0$
c. Graph on Desmos and then find the coordinates of the vertices of the feasible region and substitute them into the function from part a.
d. Answer the problem.

1. The student activities department of a community college plans to rent buses and vans for a spring break trip. Each bus has 40 regular seats and 1 handicapped seat; each van has 8 regular seats and 3 handicapped seats. A total of 320 regular and 36 handicapped seats are required for the trip.

   The activities department wishes to keep costs low. The rental cost is $350 for each van and $975 for each bus. How many vehicles of each type should be rented to minimize cost? What is the minimum cost?

   Let x = the number of buses; let y = the number of vans.

   Write a system of equations & a function to be minimized:

	x	y	Total
$f(x, y) =$			

   Find the coordinates & the vertices & evaluate:

(x, y)	$f(x, y)$

   Answer the problem:

2. A large institution is preparing lunch menus containing foods A and B. The specifications for the two foods are given in the following table:

	Units of Fat/Ounce	Units of Carbs/Ounce	Units of Protein/Ounce
Food A	1	2	1
Food B	1	1	1

   Each lunch must provide at least 6 units of fat per serving, at least 10 units of carbohydrates, and no more than 7 units of protein.

   The institution can purchase food A for $0.12 per ounce and food B for $0.08 per ounce. How many ounces of each food should a serving contain to meet the dietary requirements for the least cost?

   Let x = the ounces of food A; y = ounces of food B

   Write a system of equations & a function to be minimized:

	x	y	Total
$f(x, y) =$			

   Find the coordinates & the vertices & evaluate:

(x, y)	$f(x, y)$

   Answer the problem:

3. Johnson's Produce is purchasing fertilizer with two nutrients: N (nitrogen) and P (phosphorus). They need at least 180 units of N and 90 units of P. Their suppliers has two brands of fertilizer for them to buy. Brand A has 4 units of N and 1 unit of P. Brand B has 1 unit of each nutrient.

Brand A costs $10 a bag while Brand B costs $5 a bag. If Johnson's Produces wishes to minimize costs, how many bags of each brand should be purchased? How much will it cost?

Let x = number of bags of Brand A; y = number of bags of Brand B

Write a system of equations & a function to be minimized:

	x	y	Total
$f(x,y) =$			

Find the coordinates & the vertices & evaluate:

(x, y)	$f(x, y)$

Answer the problem:

4. A banquet hall offers two types of tables for rent: rectangular tables and round tables. The rectangular tables sit 6 people; the round tables provide seating for 10 people. Kathleen would like to rent the hall for a wedding banquet and needs tables for 250 people. The room can have a maximum of 35 tables and the hall only has 15 rectangular tables available.

Kathleen would like to keep her costs as low as possible. A rectangular table costs $28 each and the round tables cost $52 each. How many of each type of table should be rented to minimize cost and what is the minimum cost?

Let x = the number of 6-person/rectangular tables; y = the number of 10-person/round tables

Write a system of equations & a function to be minimized:

	x	y	Total
$f(x,y) =$			

Find the coordinates & the vertices & evaluate:

(x, y)	$f(x, y)$

Answer the problem:

Chapter 2: Linear Functions