3.4 Linear Programming
Algebra 2A

Example 1: A school board is investigating various ways of composing the faculty for a proposed new charter school. They must hire both teachers and teacher assistants. The amount of money the school district will have to spend on salaries each year depends on how many teachers and assistants are hired.

Let **t = number of teachers**
a = number of teacher assistants
d = number of thousands of dollars spent annually on salaries

The average teacher salary is $40,000 and the assistant salary is $28,000.

A. Write the objective function to represent the total cost of the annual salary.

B. The CT Department of Education has requirements for the make up of school faculties.

a. The building can accommodate no more than 50 faculty members.

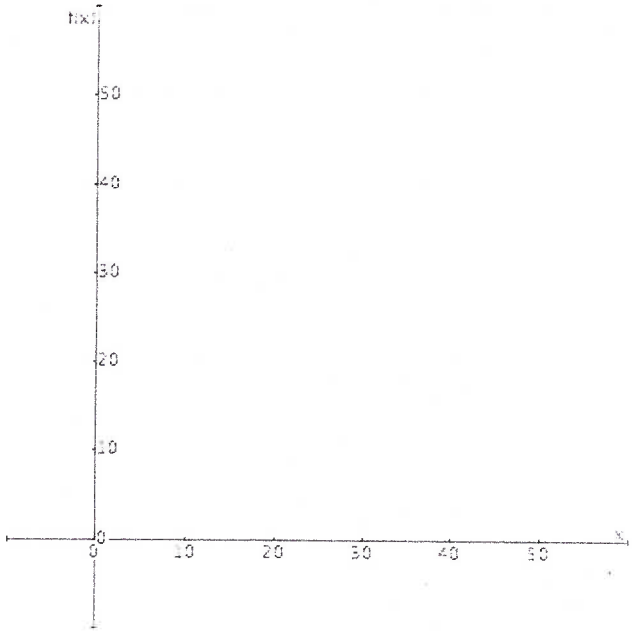
b. A minimum of 20 faculty members is needed to staff the school.

c. The school cannot be entirely run by assistants; so there must be at least 12 teachers.

d. For a proper teacher to assistant ratio, the number of teachers must be no more than half the number of assistants

e. It is (obviously) impossible to hire a negative number of employees.

C. Graph the feasible region.



D. Identify the vertices of the feasible region.

E. Do you want to maximize or minimize in this situation?

F. At what point does this occur? Write your conclusion statement.

Example 2: Jake opens a music shop in which he sells guitars and drums. He wants to figure out how to maximize his profit.

A. Each drumset costs him $900 and each guitar will cost him $750. Write an expression for the total number of dollars he will have to spend.

B. Jake has certain restrictions on the number of each kind of instrument he can stock.

i. His store is small, so he can buy no more than 50 instruments.

ii. Because guitars are more popular than drums, the number of guitars must be at least twice the number of drums.

iii. To get started he must buy at least 17 guitars and at least 5 drumsets.

C. Plot the feasible region.