Exercise 2

a) The maximum profit that Omega Manufacturing Company can get is $2904.7619 each week and it could be achieved by producing 26.1905 units of product 1, 54.7619 units of product 2, and 20 units of product 3.

b) In order to get $ 5750 that is the maximum the annual income, the family should plant 56.25 acres of soybeans and buy 23.75 cows. With such a plan all winter and summer available hours will be spend, 33.13 acres of land will not be used and $1150 of funds will not be used. There still will be room available for hens and cows.

c) Each pig should be given daily 1.142857 kg of corn and 2.428571 kg of alfalfa, no tankage should be given to raise the pigs. The minimum cost to raise a pig per day is 120.8571.The vitamin requirement is exceeded by 7.1429, but the carbohydrates and protein are just met.

d) The maximum profit the corporation can achieve is $696000. That amount could be attained if plant 1 produces all the 516.667 large size products; a total of 844.444 medium size products are produced, 666.667 by plant 2 and the remaining ones by plant 1; finally, the small sized ones are assigned to plants 2 and 3, 166.667 and 416.667, respectively.

e) The minimum cost to meet the requirements is $7700. All the electricity will supply electricity (30 units), for space heating 30 units by natural gas and 20 units by solar, and the water heating will be provided by solar energy (20 units).

f) The maximum profit that the cargo company can do is $13330. Cargo type 1 should be divided, 7 tones in the front compartment and 8.5 in the center; cargo type 2 should be placed in the three compartments 5 tones in front, 3.167 in center and 3.333 in back, no type 3 cargo should be transported, and concerning cargo type 4, 6.333 tones in center and 6.667 in back.

g) At the end of year 5 Al ferries will get a capital of $152 880, the investment plan should be to invest in A at the beginning of first year and third year, $60 and $84 thousand dollars, respectively, and at the beginning of year five $117 600 in D.