**Homework Chapter III -IV**

1. Farmer Brazos has a small farm on which he grows three types of crops: cotton, corn and hay. The farmer seeks to determine the amount of each crop he should grow so as to maximize net returns.

 The scarce resources Joe must allocate are 640 acres of land and 900 acre ft of water. From previous experience, Joe has developed the following information per acre of crops grown:

|  |  |  |  |
| --- | --- | --- | --- |
|   |  Cotton  |  Corn |  Hay |
| Water use ( acre feet per acre) | 0.7  | 2.2 | 1.0 |
| Yield per acre (crop units per acre) | 0.8 | 100 | 2 |
| Sale price ($/ crop unit) | 450 | 3.2 | 80 |
| Cost of production ($/acre) | 320 | 200 | 25 |

 a. Set up and solve this problem

b. Interpret at least 2 elements from the numerical counterparts of each the following terms at optimality

i. CB B -1

ii. B -1

iii. B -1 b

iv. CB B -1 b (one element only)

v. CB B -1 ANB - CNB

 2. Solve the following

 Max 4 x1+ 2x2

 s.t. 3 x1 + x2 < 12

 x1 < 2

 x2 < 6

 x1 , x2 > 0

Explain your selections of variables to enter and leave the basis, the reduced costs and the shadow prices

 3. Solve the following

 Max 4 x1+ 2x2

 s.t. 2 x1 + x2 < 12

 x1 < 11

 x2 < 6

 x1 , x2 > 0

Explain your selections of variables to enter and leave the basis and the reduced costs and variable values