

(Group 6)

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Problem 3-6 : A Blending Problem : Douglas E. Starr, the manager of Heavenly Hound Kennels, Inc., provides lodging for pets. The kennels' dog food is made by mixing three grain products to obtain a well-balanced dog diet. The data for the three products are shown in the following table. If Douglas wants to make sure that each of his dog consumes at least 8 ounces of protein, 1 ounce of carbohydrate, and no more than 0.5 ounces of fat each day, how much of each grain product should each dog be fed in order to minimize Douglas' cost? (Note: 16 ounces = 1 pound)

GRAIN PRODUCT	COST PER POUND (\$)	PROTEİN (%)	CARBOHYDRATE (%)	FAT (%)
A	0.45	62	5	3
B	0.38	55	10	2
C	0.27	36	20	1

Solution of the problem:

We defined the variables as follows:

X_A : amount of grain product A,

X_B : amount of grain product B,

X_C : amount of grain product C.

Then the model is:

$$\text{Min : } 0.45 X_A + 0.38 X_B + 0.27 X_C$$

$$\text{s.t. } 0.62 X_A + 0.55 X_B + 0.36 X_C \geq 8/16 \quad (\text{minimum protein})$$

$$0.05 X_A + 0.10 X_B + 0.20 X_C \geq 1/16 \quad (\text{minimum carbohydrate})$$

$$0.03 X_A + 0.02 X_B + 0.01 X_C \geq 0.5/16 \quad (\text{minimum fat})$$

$$X_A, X_B, X_C \geq 0$$

Note: You can see the solution of the problem in [group6_prob06.xls](#) excel document by using the solver.