

Applied Optimization Assignment #1

Name: _____
Date: _____ Hour: ____

For each problem, do the following:

- (a) Define the variables.
- (b) Write the objective function.
- (c) Write the constraints.
- (d) Graph the constraints.
- (e) Identify the vertices of the feasible solutions.
- (f) Evaluate the objective function at each of the vertices of the feasible region.
- (g) Answer the question(s).

1. **MINIMIZE COST** A dietician formulates a special breakfast cereal by mixing Oat Flakes and Crunchy O's. The cereals each provide protein and carbohydrates in the amounts shown below.



1 cup: 6 grams protein;
30 grams carbohydrates



1 cup: 3 grams protein;
40 grams carbohydrates

The dietician wants to produce a mixture that contains at least 210 grams of protein and at least 1200 grams of carbohydrates. The cost is 38 cents for 1 cup of Oat Flakes and 32 cents for 1 cup of Crunchy O's. How many cups of each cereal will satisfy the constraints and minimize the cost? What is the minimum cost?

2. MAXIMIZE PROFIT A manufacturer makes two types of golf clubs: a starter model and a professional model. The starter model requires 4 hours in the assembly room and 1 hour in the finishing room. The professional model requires 6 hours in the assembly room and 1 hour in the finishing room. The total number of hours available in the assembly room is 108. There are 24 hours available in the finishing room. The profit for each starter model is \$35, and the profit for each professional model is \$55. Assuming all the sets produced can be sold, find how many of each set should be manufactured to maximize profit.