Math 105-21 Summer Term II
Test 3: 6/24 Name: _____

1. (*15 points*) Given the following linear program:

Let S=the number of standard surfboards, C=number of competitive surfboards

Maximize: $P = \$40S + \$75C$

Subject to: $6S + 8C \leq 120$

$S + 3C \leq 30$

$S \geq 0,\ C \geq 0$

A) Is it feasible to make 9 Standard surfboards and 8 competition surfboards? If so, what is the profit?

2. (*15 points*) Given the following linear program:

Let T = the number of Trick water skis, S = the number of competitive surfboards

Maximize: $P = \$40T + \$30S$

Subject to: $6T + 4S \leq 108$

$T + S \leq 24$

$T \geq 0,\ S \geq 0$

A) Is it feasible to make 5 trick water skis and 13 slalom water skis? If so, what is the profit?

3. (*15 points*) The Florida Juice Company makes two types of fruit punch Fruity and Tangy by blending orange juice and apple juice into a mixture. The fruit punch is sold in 5-gallon bottles. A bottle of Fruity earns a profit of $3, and a bottle of Tangy earns a $2 profit. A bottle of Fruity requires 3 gallons of orange juice and 2 gallons of apple juice, while a bottle of Tangy requires 4 gallons of orange juice and 1 gallon of apple juice. There are 200 gallons of apple juice and 120 gallons of orange juice available.
A)What is the Linear Program for this question?

4. (*15 points*) Cardinal Candy makes a Rick Pitino mix and a Denny Crum mix. A box of Rick Mix takes 0.4 pounds of chocolate, 0.2 pounds of nuts, and 0.4 pounds of fruit, and sells for $12.95. A box of Denny Mix takes 0.2 pounds of chocolate, 0.2 pounds of nuts, and 0.6 pounds of fruit, and sells for $9.95. Chocolate costs $6 per pound, nuts cost $4 per pound, and fruit costs $3 per pound. This week, Cardinal Candy has 44 pounds of chocolate, 26 pounds of nuts, and 72 pounds of fruit.
A)What is the Linear Program for this question?

5. (*20 points*) A furniture manufacturer makes wooden tables and chairs. The production process involves two basic types of labor: carpentry and finishing. A table requires 2 hours of carpentry and 1 hour of finishing, whereas a chair requires 3 hours of carpentry and hour of finishing. The profit is $35 per table and $20 per chair. The manufacturer's employees can supply a maximum of 108 hours of carpentry work and 20 hours of finishing work per day.
A)What is the Linear Program for this question?
B)Is it feasible to make 20 tables and no chairs? If so, what is the profit?

6. (*20 points*) A farmer has 70 acres of land available for planting soybeans or wheat. The cost of preparing the soil is $60 per acre for soybeans and $30 per acre for wheat. The number of workdays of labor required is 3 days per acre for soybeans and 4 days per acre for wheat. The farmer cannot spend more than $1800 in preparation costs nor can he use more than 120 workdays. Each acre of soybeans yields a profit of $180, while each acre of wheat yields a profit of $100.
A)What is the Linear Program for this question?
B) Is it feasible to plant 0 acres soybeans and 0 acres of wheat?

7. (*50 points*) A manufacturer of fiberglass camper tops for pickup trucks makes a compact model and a regular model. Each compact top requires 5 hours from the fabricating department and 2 hours from the finishing department. Each regular top requires 4 hours from the fabricating department and 3 hours from the finishing department. The maximum hours available per week in the fabricating department and finishing department, respectively, are 200 and 108. The company makes a profit of $40 on each compact top and $50 on each regular top.

A)What are the products? Assign production variables for each product.

B)What is the profit function?

C)Fill out a product Resources Chart, what is the constraints?

D) Is it feasible to make 30 compact tops and 10 regular tops? If so, what is the profit?

E) Graph the constraints and shade the feasible region.

F) List the Corner Points.

G) Solve/Maximize the linear program