

Problem # 2 & #3

Name _____

Date _____

Advanced Algebra Unit 6

Linear Programming Problems

Directions: Write your constraints for each problem, graph the feasible region, write the "profit" equation, test your corner points to find the combination that maximizes profit.

1) A ticket office sells General Admission tickets and reserved tickets. The auditorium holds no more than 5000 people. There can be no more than 3000 reserved tickets and no more than 4000 general admission tickets sold. General Admission tickets sell for \$75. Reserved tickets sell for \$125. How many of each type of ticket should the auditorium sell to maximize their profit?

$$\begin{aligned} \textcircled{1} \quad & g + r \leq 5000 && (5,000, 0) && (0, 5,000) \\ & && \uparrow g && \uparrow r \\ \textcircled{2} \quad & r \leq 3,000 \\ \textcircled{3} \quad & g \leq 4,000 \end{aligned}$$

2) A ski manufacturer makes two types of skis. They have a fabricating department and a finishing department. A pair of downhill skis require 6 hours to fabricate and 1 hour to finish. A pair of cross county skis require 4 hours to fabricate and 1 hour to finish. The fabricating department has 108 hours of labor available per day. The finishing department has 24 hours per day. The profit on each pair of downhill skis is \$40 and \$35 for cross country. **How many pairs of skis should the company produce to maximize their profit?**

$$\begin{aligned} 4c + 6d &\leq 108 \\ c + d &\leq 24 \end{aligned}$$

	Fabricate	Finish
CC	4	1
D	6	1
	≤ 108	≤ 24

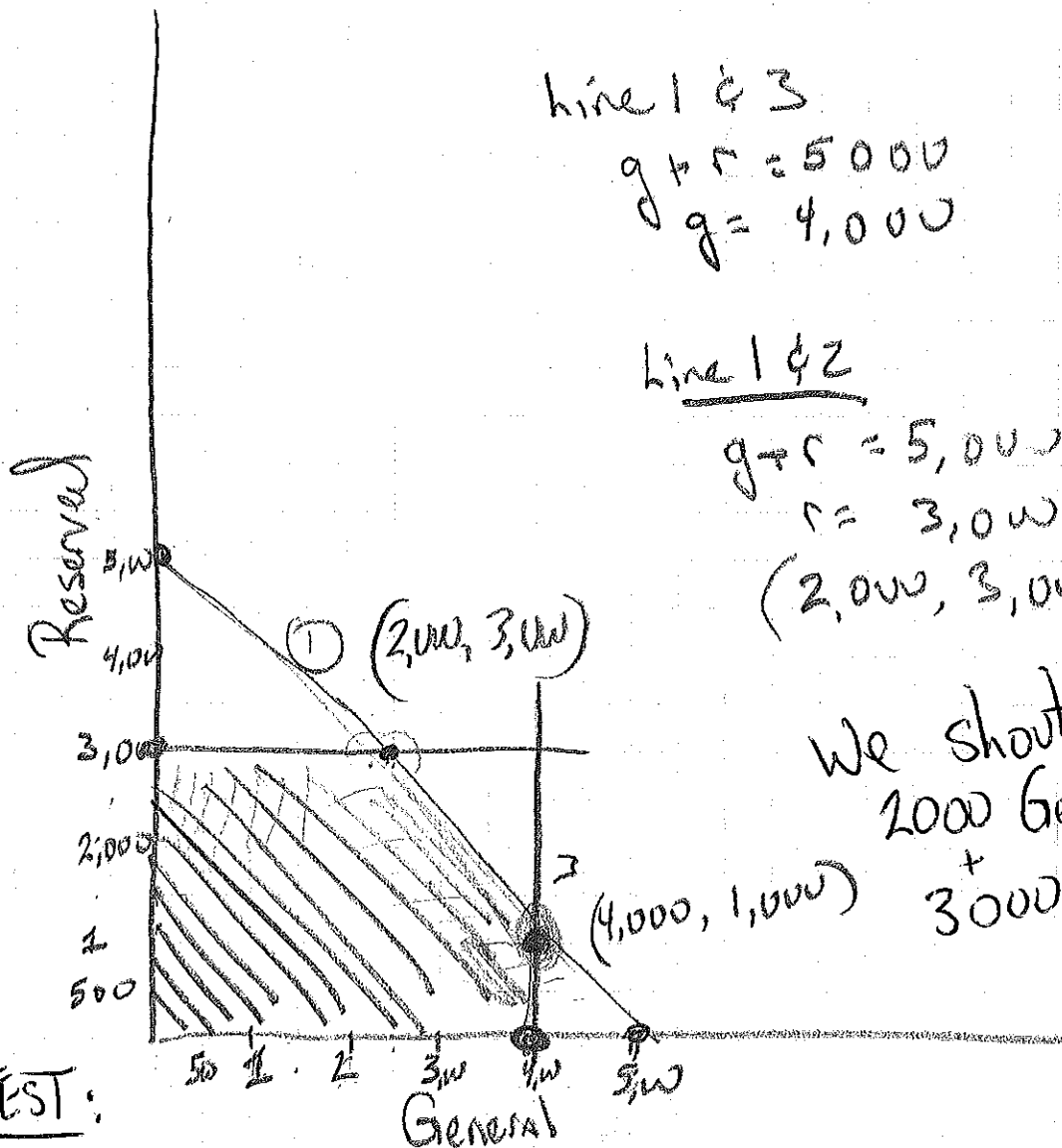
Linear Programming # 2 Ticket

g = general (x)

r = reserved (y)

constraints

- ① $g + r \leq 5,000$ (5,000, 0) (0, 5,000)
- ② $r \leq 3,000$ (2) $r = 3,000$ horizontal
- ③ $g \leq 4,000$ (3) vertical



line 1 & 3

$$\begin{aligned} g + r &= 5000 \\ g &= 4000 \end{aligned}$$

line 1 & 2

$$\begin{aligned} g + r &= 5,000 \\ r &= 3,000 \\ (2,000, 3,000) \end{aligned}$$

We should make
2000 General
+
3000 Reserved
Tickets

Profit TEST:

$$75G + 125R$$

$$(0, 3,000)$$

$$75(0) + 125(3,000) = 375,000$$

$$75(4,000) + 0 = 300,000$$

$$75(2,000) + 125(3,000) = 525,000$$

$$75(4,000) + 125(1,000) = 425,000$$

Linear Programming #3 The Ski Problem

$$4c + 6d \leq 108 \quad (27, 0) \quad (0, 18)$$

$$c + d \leq 24 \quad (24, 0) \quad (0, 24)$$

$$\begin{array}{r} 4c + 6d = 108 \\ c + d = 24 \quad (-4) \\ \hline \end{array}$$

$$\begin{array}{r} 4c + 6d = 108 \\ -4c - 4d = -96 \\ \hline \end{array}$$

$$2d = 12$$

$$d = 6$$

$$c = 18$$

