Case Notes

# Module A: Linear Programming

# Happy hour, happy profit

## Case Summary

*This case describes Ross’ product-mix decision problem with a goal to maximize weekly profit from bar sales while meeting his financial obligations and resource constraints.*

Case Analysis *This case illustrates a typical decision problem that can be solved by using linear programming technique. Such problem involves optimizing an objective (e.g., maximizing profit) subject to constraints (e.g., limited resource availability).*

## Sample Answers to Case Questions

1. Set up Ross’s challenge as a linear programming (LP) problem. Identify the critical decision variables, objective function, and constraints.

The decision variables are:

X1: number of bottles of beer to be sold per week,

X2: number of glasses of wine to be sold per week,

X3: number of glasses of mixed drink to be sold per week

The objective function is to maximize weekly profit:

Maximize weekly profit = 2.15 X1 + 3.10 X2 + 4.25 X3

The constraints are: (1) cost of drinks cannot exceed the $7000 cash available; (2) hours used to serve the drinks cannot exceed the 90 hours available; and (3) the minimum number of drinks required to sell per week to meet financial obligation.

1.85 X1 + 2.50 X2 + 3.00 X3 <= 7000

X1 + 2 X2 + 5 X3 <= 90 x 60

X1 >= 1000

X2 >= 900

X3 >= 500

2. What is the optimal combination of drinks that Ross must sell to maximize his profits each week?

X1 = 1100

X2 = 900

X3 = 500