

# MA 162: Finite Mathematics - Section 4.1

Fall 2014

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Announcements:

- Homework 4.1a due Friday at 6pm.
- Homework 4.1b due Tuesday at 6pm.

# The Simplex Algorithm

- 1 Setup the initial simplex tableau.
- 2 Determine whether the optimal solution has been reached by examining all entries in the last row to the left of the vertical line.
  - If all entries are non-negative, the optimal solution has been reached. Proceed to Step 4.
  - If there are one or more negative entries, the optimal solution has not been reached. Proceed to Step 3.
- 3 Perform the pivot operation. Locate the pivot element and convert that column to a unit column. Return to Step 2.
- 4 Determine the optimal solution(s). Non-basic variables get set to zero and the other variables can be read off the final table.

# Tan, Section 4.1, #18

Maximize  $P = 5x + 3y$  subject to

$$\begin{array}{rclcl} x & + & y & \leq & 80 \\ 3x & & & \leq & 90 \end{array}$$

and  $x \geq 0, y \geq 0$ .

# Tan, Section 4.1, #25

Maximize  $P = 3x + 4y + 5z$  subject to

$$\begin{array}{rcccccc} x & + & y & + & z & \leq & 8 \\ 3x & + & 2y & + & 4z & \leq & 24 \end{array}$$

and  $x \geq 0, y \geq 0, z \geq 0$ .

## Tan, Section 4.1, #46

Boise Lumber manufactures prefabricated houses. They offer three models: standard, deluxe, and luxury. Each house is prefabricated and partially assembled in a factory. The final assembly is done on-site.

The dollar amount of building material required, the amount of labor required, the amount of on-site labor required, and the profit per unit are as follows:

	Standard	Deluxe	Luxury
Material	\$6000	\$8000	\$10000
Factory Labor	240	220	200
On-site Labor	180	210	300
Profit	\$3400	\$4000	\$5000

They have \$8200000 is budgeted for building materials, 218000 hours of factory labor, and 237000 hours of on-site labor.

How many houses of each type should they build in order to maximize their profit?