

Math 30210 — Introduction to Operations Research

Quiz 8 – Wednesday November 7, 2007

NAME: _____

Instructions: This is a closed-book quiz. Please do not use any notes.

Consider the following linear programming problem:

$$\begin{aligned} \text{Maximize } & 4x_1 - x_2 + 3x_3 \text{ subject to } x_1, x_2, x_3 \geq 0 \text{ and } \\ & x_1 + x_2 + .5x_3 \leq 5 \\ & 2x_1 + 4x_2 - x_3 \leq 4 \\ & 4x_1 + x_2 - 2x_3 \leq 7. \end{aligned}$$

Slack variables s_1, s_2, s_3 are introduced to the three constraints, and the simplex algorithm is run starting from the all-slack solution, leading to this final tableau:

Basic	x_1	x_2	x_3	s_1	s_2	s_3	Soln.
Max	2	W	0	6	0	0	30
z	X	2	1	2	0	0	10
s_2	Y	6	0	2	1	0	14
s_3	Z	5	0	4	0	1	27

1. Write down the inverse matrix.
2. What are the missing values **X**, **Y**, **Z**?
3. The variables for the dual problem are y_1 (corresponding to the first constraint), y_2 and y_3 . What are the values of these variables at the dual optimum?
4. What is the missing value **W**?