

Math 164, Vese

Homework #4, due on Friday, February 3rd, 2006

Remarks:

- Please review Sections 4.1, 4.2 and 4.3 from the textbook.

[1] Solve the following linear program graphically:

minimize

$$z = 3x_1 + x_2,$$

subject to

$$\begin{aligned}x_1 - x_2 &\leq 1, \\3x_1 + 2x_2 &\leq 12, \\2x_1 + 3x_2 &\leq 3, \\-2x_1 + 3x_2 &\geq 9, \\x_1, x_2 &\geq 0.\end{aligned}$$

[2] Consider the following linear program:

minimize

$$z = 3x_1 + x_2,$$

subject to

$$\begin{aligned}-x_1 + x_2 &\geq -1, \\3x_1 + 2x_2 &\leq 12, \\2x_1 + 3x_2 &\leq 3, \\x_1, x_2 &\geq 0.\end{aligned}$$

- Solve the problem graphically.
- Write the problem in standard form.

[3] Consider the system of linear constraints

$$\begin{aligned}2x_1 + x_2 &\leq 100, \\x_1 + x_2 &\leq 80, \\x_1 &\leq 40, \\x_1, x_2 &\geq 0.\end{aligned}$$

(a) Write this system in standard form, and determine all the basic solutions (feasible and infeasible).

(b) Determine the extreme points of the feasible region (corresponding to both the standard form, as well as the original version).