

# General Mathematics and CPS II

## Exercise 17

April 25, 2012

1. Use the simplex method to solve the following linear programming problem.

Maximize

$$z = 2x_1 + x_2$$

subject to

$$3x_1 + x_2 \leq 6,$$

$$x_1 - x_2 \leq 2,$$

$$x_2 \leq 3,$$

$$\mathbf{x} \geq 0.$$

2. Suppose each of the following tableaus occurs in the course of performing the simplex algorithm on a linear programming problem.

(a)

$x_1$	$x_2$	$x_3$	$x_4$	
-1	1	0	0	4
-2	0	-2	1	1
5	0	3	0	5

(b)

$x_1$	$x_2$	$x_3$	$x_4$	
0	-1	1	-1	4
1	1	0	0	1
0	1	0	-2	5

(c)

$x_1$	$x_2$	$x_3$	$x_4$	
2	-1	0	1	0
1	1	1	0	1
2	1	0	0	10

(d)

$x_1$	$x_2$	$x_3$	$x_4$	
2	1	0	1	3
1	0	1	4	3
2	0	0	0	8

State, for each case, whether

- The problem has a finite solution;
- The solution is unique;
- The solution is degenerate (i.e., one of the basic variables is zero).