

Assignment 7 for MAT 3210 – Section 5.1
(no need to hand in)

1. Find the dual problem of the following LPP:

- (1) maximize $z = 40x_1 + 20x_2 + 2x_3$
 subject to $3x_1 - 3x_2 + 5x_3 \leq 50$
 $x_1 + x_3 \leq 10$
 $x_1 - x_2 + 4x_3 \leq 2$
 $x_1, x_2 \geq 0, x_3$ is free
- (2) maximize $z = 3x_1 + x_2$
 subject to $x_1 + 2x_2 \leq 5$
 $x_1 + x_2 - x_3 \leq 2$
 $7x_1 + 3x_2 - 5x_3 \leq 20$
 x_1, x_2, x_3 are free
- (3) maximize $z = 5x_1 + 6x_2$
 subject to $x_1 + 2x_2 = 5$
 $-x_1 + 5x_2 \geq 3$
 x_1 free, $x_2 \leq 0$
- (5) minimize $z = x_1 + x_2$
 subject to $2x_1 + x_2 \leq 5$
 $3x_1 - x_2 \geq 6$
 x_1, x_2 free
- (6) maximize $z = c_1x_1 + c_2x_2 + c_3x_3$
 subject to $a_{11}x_1 + a_{12}x_2 + a_{13}x_3 \geq b_1$
 $a_{21}x_1 + a_{22}x_2 + a_{23}x_3 = b_2$
 $a_{31}x_1 + a_{32}x_2 + a_{33}x_3 \leq b_3$
 $x_1 \geq 0, x_2 \leq 0, x_3$ free
- (7) maximize $x_0 = c^T x$
 subject to $Ax = b$
 $l_i \leq x_i \leq u_i, i = 1, \dots, n$