

1. Each of the following linear programming models is neither standard nor canonical. Explain (all of the ways) why.

- (a) Minimize $z = 3x + 2y$ subject to the constraints

$$2x + y \leq 4$$

$$3x - 2y \leq 6$$

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

- (b) Maximize $z = 2x_1 + 3x_2 + 4x_3$ subject to the constraints

$$3x_1 + 2x_2 - 3x_3 \leq 4$$

$$2x_1 + 3x_2 + 2x_3 \leq 6$$

$$3x_1 - x_2 + 2x_3 \geq -8$$

$$x_1 \geq 0, x_2 \geq 0, x_3 \geq 0.$$

- (c) Maximize $z = 3x + 2y + 3v - 2w$ subject to the constraints

$$2x + 6y + 2v - 4w = 7$$

$$3x + 2y - 5v + w = 8$$

$$6x + 7y + 2v + 5w \leq 4$$

$$x \geq 0, y \geq 0, v \geq 0, w \geq 0.$$

- (d) Maximize $z = 2x + 5y$ subject to the constraints

$$3x + 2y \leq 6$$

$$2x + 9y \leq 8$$

$$x \geq 0.$$

- (e) Minimize $z = 2x_1 + 3x_2 + x_3$ subject to the constraints

$$2x_1 + x_2 - x_3 = 4$$

$$3x_1 + 2x_2 + x_3 = 8$$

$$x_1 - x_2 = 6$$

$$x_1 \geq 0, x_2 \geq 0.$$

2. Use the techniques discussed in class to turn the linear programming problems from the previous page into standard (and canonical) form.