**Quiz 3 for Statistics 213**
**Probability and Decision Theory - Spring 2000**
**Material Covered: Sections 4.2 and 4.3 of Workbook and text**
**For: 25th February**

This is a 15 minute quiz, worth 6% and marked out of 6 points. The total possible points awarded for each question is given in square brackets at the beginning of each question. Anything that can fit on one side of an $8\frac{1}{2}$ by 11 inch piece of paper may be used as a reference during this quiz. A calculator and appropriate statistical tables may also be used. No other aids are permitted.

**Name (please print):** _____ . **ID Number:** _____.
last first

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**1.** Consider the following standard minimization problem,

$$\begin{array}{lccccccc} \text{Minimize} & 10x & + & 3y & + & 10z & & \\ \text{subject to} & 2x & + & y & + & 5z & \geq & 20 \\ & 4x & + & y & + & z & \geq & 30 \\ & x & & & & & \geq & 0 \\ & & & y & & & \geq & 0 \\ & & & & & z & \geq & 0 \end{array}$$

with final tableau of

| $u$ | $v$ | $x$ | $y$ | $z$ | $P$ | |
|---|---|---|---|---|---|---|
| 0 | 1 | $\frac{1}{2}$ | -1 | 0 | 0 | 2 |
| 1 | 0 | $-\frac{1}{2}$ | 2 | 0 | 0 | 1 |
| 0 | 0 | 2 | -9 | 1 | 0 | 3 |
| 0 | 0 | 5 | 10 | 0 | 1 | 80 |

**(a)** [1] The optimal solution to the *primal* problem

is at _____,

where the objective function has value _____.

**(b)** [1] The optimal solution to the *dual* problem

is at _____,

where the objective function has value _____.

**(c)** [2] The *initial* tableau is given by:

| $u$ | $v$ | $x$ | $y$ | $z$ | $P$ | |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | | | | |

**(d)** [2] The next tableau after the first tableau is given by:

| $u$ | $v$ | $x$ | $y$ | $z$ | $P$ | |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | | | | |

**(a)** [1] (5,10,0); 80

**(b)** [1] (2,1); 80

**(c)** [2] The *initial* tableau is given by:

| $u$ | $v$ | $x$ | $y$ | $z$ | $P$ | |
|---|---|---|---|---|---|---|
| 2 | 4 | 1 | 0 | 0 | 0 | 10 |
| 1 | 1 | 0 | 1 | 0 | 0 | 3 |
| 5 | 1 | 0 | 0 | 1 | 0 | 10 |
| -20 | -30 | 0 | 0 | 0 | 1 | 0 |

**(d)** [2] The next tableau after the first tableau is given by:

| $u$ | $v$ | $x$ | $y$ | $z$ | $P$ | |
|---|---|---|---|---|---|---|
| 0.5 | 1 | 0.25 | 0 | 0 | 0 | 2.5 |
| 0.5 | 0 | -0.25 | 1 | 0 | 0 | 0.5 |
| 4.5 | 0 | -0.25 | 0 | 1 | 0 | 7.5 |
| -5 | 0 | 7.5 | 0 | 0 | 1 | 75 |