Econ 172A, Fall 2010: Quiz I

IMPORTANT

1. The quiz has 3 forms. You should answer the questions from only one form.
   - If your student identification number ends in 1, 4, 7 answer the questions from Form 1.
   - If your student identification number ends in 2, 5, 8, 0 answer the questions from Form 2.
   - If your student identification number ends in 3, 6, 9, or if you have no student identification number, answer the questions from Form 3.

2. You may not use calculators, books, or notes during this quiz.

3. If you do not know how to interpret a question, then ask me.

4. Please remain in your seat until the exam is over.

5. You will not receive credit unless you put your answers in the spaces below.

6. I will collect the quizzes at 12:20.

RECORD ANSWERS

- NAME:
- STUDENT IDENTIFICATION NUMBER:
- I read the instructions and I am answering the questions corresponding to the appropriate form, which is FORM:

Question 1. Circle the correct choice or choices: a. b. c. d.

Question 2. Circle the correct choice or choices: a. b. c. d.
Form I

This is Form 1. Use this form if your student ID ends in 1, 4, 7. Otherwise use another form.

1. Consider the Linear Programming Problem:

\[
\begin{align*}
\text{max} & \quad x_0 \\
\text{subject to} & \quad -3x_1 + 2x_2 \leq -1 \\
& \quad x_1 - x_2 \leq 2 \\
& \quad x \geq 0
\end{align*}
\]

Indicate on the front page which of the choices below are true. I recommend that you solve the problem by graphing the feasible set, but you need not show your work. (More than one statement may be true.)

(a) It possible to find a linear function \( x_0 \) (depending on \( x_1 \) and \( x_2 \)) such that the problem has a unique solution.

(b) It is possible to find a linear function \( x_0 \) (depending on \( x_1 \) and \( x_2 \)) such that the problem is not feasible.

(c) It is possible to find a linear function \( x_0 \) (depending on \( x_1 \) and \( x_2 \)) such that the problem has no solution.

(d) It is possible to find a linear function \( x_0 \) (depending on \( x_1 \) and \( x_2 \)) such that \( x = (2, 0) \) is a solution to the problem.

2. An agricultural supply company makes two grades of chicken feed. Grade A chicken feed is 40% corn and 60% barley. Grade B chicken feed is 10% corn and 90% barley. Let \( x_C \) = number of pounds of corn used; \( x_B \) = number of pounds of barley used; \( y_A \) = number of pounds of Grade A produced; and \( y_B \) = number of pounds of Grade B produced. Which of the constraints below is always consistent with this information? Indicate your answer on the first page. (More than one statement may be true.)

(a) \( y_A = .4x_C + .6x_B \).

(b) \( x_B = .6y_A + .9y_B \).

(c) \( y_B = .1x_C + .9x_B \).

(d) \( x_C = .4y_A + .1y_B \).
Form 2

This is Form 2. Use this form if your student ID ends in 2, 5, 8, 0. Otherwise use another form.

1. Consider the Linear Programming Problem:

\[
\begin{align*}
\text{max} & \quad x_0 \\
\text{subject to} & \quad -3x_1 + 2x_2 \leq -1 \\
& \quad x_1 - x_2 \leq 1 \\
& \quad x \geq 0
\end{align*}
\]

Indicate on the front page which of the choices below are true. I recommend that you solve the problem by graphing the feasible set, but you need not show your work.

(a) It is possible to find a linear function \( x_0 \) depending on \( x_1 \) and \( x_2 \) such that the problem has no solution.

(b) It possible to find a linear function \( x_0 \) depending on \( x_1 \) and \( x_2 \) such that the problem has a unique solution.

(c) It is possible to find a linear function \( x_0 \) depending on \( x_1 \) and \( x_2 \) such that the problem is not feasible.

(d) It is possible to find a linear function \( x_0 \) depending on \( x_1 \) and \( x_2 \) such that \( x = (2,0) \) is a solution to the problem.

2. An agricultural supply company makes two grades of chicken feed. Grade A chicken feed is 30% corn and 70% barley. Grade B chicken feed is 10% corn and 90% barley. Let \( x_C \) = number of pounds of corn used; \( x_B \) = number of pounds of barley used; \( y_A \) = number of pounds of Grade A produced; and \( y_B \) = number of pounds of Grade B produced. Which of the constraints below is consistent with this information? Indicate your answer on the first page.

(a) \( y_a = .3x_C + .7x_B \).
(b) \( x_C = .3y_A + .1y_B \).
(c) \( x_B = .7y_A + .9y_B \).
(d) \( y_B = .1x_C + .9x_B \).
1. Consider the Linear Programming Problem:

\[
\begin{align*}
\text{max} & \quad x_0 \\
\text{subject to} & \quad 2x_1 - 2x_2 \leq 4 \\
& \quad -6x_1 + 4x_2 \leq -2 \\
& \quad x \geq 0
\end{align*}
\]

Indicate on the front page which of the choices below are true. I recommend that you solve the problem by graphing the feasible set, but you need not show your work.

(a) It is possible to find a linear function \( x_0 \) (depending on \( x_1 \) and \( x_2 \)) such that the problem has no solution.

(b) It is possible to find a linear function \( x_0 \) (depending on \( x_1 \) and \( x_2 \)) such that \( x = (4,0) \) is a solution to the problem.

(c) It possible to find a linear function \( x_0 \) (depending on \( x_1 \) and \( x_2 \)) such that the problem has a unique solution.

(d) It is possible to find a linear function \( x_0 \) (depending on \( x_1 \) and \( x_2 \)) such that the problem is not feasible.

2. An agricultural supply company makes two grades of chicken feed. Grade A chicken feed is 40% corn and 60% barley. Grade B chicken feed is 10% corn and 90% barley. Let \( y_C \) = number of pounds of corn used; \( y_B \) = number of pounds of barley used; \( x_A \) = number of pounds of Grade A produced; and \( x_B \) = number of pounds of Grade B produced. Which of the constraints below is consistent with this information? Indicate your answer on the first page.

(a) \( y_C = .4x_A + .1x_B \).

(b) \( x_A = .4y_C + .6y_B \).

(c) \( y_B = .6x_A + .9x_B \).

(d) \( x_B = .1y_C + .9y_B \).