Linear Programming

3/3 points earned (100%)

Retake

Course Home

Excellent!

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1 / 1 points

1.
(seed = 634506)

Which of the following constraints can be modeled by one or more linear inequalties?

- [x] x1, x2, x3, x4 >= 0

Correct

- [x] x1 + 2x2 + 3x3 + 4x4 <= 10.

Correct

- [ ] | x1 + 2x2 + 3x3 + 4x4 | = 10.

Un-selected is correct

- [x] x1 - 2x2 - 3x3 - 4x4 <= 10.

Correct

- [x] (x1 + 2x2 + 3x3 + 4x4) / (5 + 5x5 + 6x6) <= 10, where all variables are nonnegative.

Correct

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1 / 1 points

2.

(seed = 979780)
Consider the following linear programming simplex tableaux with 3 equations and 8 variables:

maximize Z

$$+\ 9/2\ x3\ -\ 4/5\ x4\ -\ 4\ x5\ -\ 5/3\ x6\ +\ 4/5\ x7\ -\ Z\ = -258$$

$$+\ 1\ x1\ -\ 2/3\ x3\ -\ 10/3\ x4\ -\ 4\ x5\ -\ 1/5\ x6\ -\ 2/5\ x7\ =\ 48$$

$$+\ 1\ x2\ -\ 5\ x3\ +\ 1\ x4\ +\ 9\ x5\ +\ 1\ x6\ -\ 4/3\ x7\ =\ 6$$

$$+\ 1\ x0\ +\ 2\ x3\ -\ 1/5\ x4\ +\ 4\ x5\ -\ 10\ x6\ +\ 2\ x7\ =\ 60$$

$$x0\ ,\ x1\ ,\ x2\ ,\ x3\ ,\ x4\ ,\ x5\ ,\ x6\ ,\ x7\ >=\ 0$$

Which variable could be the next to *enter* the basis? Check all that apply.

- [ ] x2

Un-selected is correct

- [ ] x5

Un-selected is correct

- [x] x7

Correct
The basis is { x1, x2, x0 }.

The nonbasic variables are { x3, x4, x5, x6, x7 }.

The entering variables are those nonbasic variables with a positive objective function coefficient.

- [x] x3

Correct
The basis is { x1, x2, x0 }.

The nonbasic variables are { x3, x4, x5, x6, x7 }.

The entering variables are those nonbasic variables with a positive objective function coefficient.

- [x] x6

Un-selected is correct

- [x] x1

Un-selected is correct

- [x] x4

Un-selected is correct

- [x] x0

Un-selected is correct

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1 / 1
points

3.

```
(seed = 870357)
Consider the following linear programming simplex tableaux with 5 equations and 9 variables:

    maximize Z
     +  3/2 x0            -    2 x2                      -    2 x5  -  7/3 x6                       -  Z    = -1
98
    ---------------------------------------------------------------------------------------------------------------
--
     -  7/3 x0            +    1 x2  +    1 x3           +  5/2 x5  +  1/3 x6                            =
 42
     +    2 x0            +  3/4 x2                      -  4/3 x5  -  6/5 x6           +    1 x8         =
 36
     +    2 x0  +    1 x1  -  9/2 x2                     +  7/2 x5  +  2/3 x6                            =
 36
     +    1 x0            - 10/3 x2                     +  9/2 x5  +   10 x6  +    1 x7                  =
 30
     -    3 x0            -  1/3 x2           +    1 x4  -    7 x5  -  4/3 x6                            =
 6
            x0  ,      x1  ,      x2  ,      x3  ,      x4  ,      x5  ,      x6  ,      x7  ,      x8         >=
 0


Suppose that variable x0 is the variable chosen to enter the basis.
Which variable or variables could be the next to *leave* the basis? Check all that apply.
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- [ ] x2

Un-selected is correct

- [ ] x5

Un-selected is correct

- [ ] x7

Un-selected is correct

- [ ] x3

Un-selected is correct

- [ ] x6

Un-selected is correct

- [ ] x8

Correct
The basis is { x3, x8, x1, x7, x4 }.

The nonbasic variables are { x0, x2, x5, x6 }.

The entering variable is x0.

The min ratio test determines the leaving variable: min ratio = { *, 18, 18, 30, * } = 18.

The minimum occurs in rows 1 and 2, which corresponds to basic variables x8 and x1.

The leaving variables are { x8 x1 }.

 x1

Correct
The basis is { x3, x8, x1, x7, x4 }.

The nonbasic variables are { x0, x2, x5, x6 }.

The entering variable is x0.

The min ratio test determines the leaving variable: min ratio = { *, 18, 18, 30, * } = 18.

The minimum occurs in rows 1 and 2, which corresponds to basic variables x8 and x1.

The leaving variables are { x8 x1 }.

 x4

Un-selected is correct

 x0

Un-selected is correct