Linear Programming

2/3 points earned (66%)

Excellent!

---

1 / 1 points

1.

(seed = 873309)

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

☐ | x1 + 2x2 + 3x3 + 4x4 | = 10.

Un-selected is correct

☑ x1 + 2x2 + 3x3 + 4x4 = 10.

Correct

☐ 16 (x1)^2 >= 20

Un-selected is correct

☑ | x1 + 2x2 + 3x3 + 4x4 | <= 10.

Correct

☑ 16 (x1)^2 <= 20

Correct

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

☑ 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.

☑ 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.

☐ x6

Un-selected is correct

☐ x1

Un-selected is correct

☐ x4

Un-selected is correct

☐ x0

Un-selected is correct

✖   0 / 1
      points

3.

```
(seed = 68492)
Consider the following linear programming simplex tableaux with 5 equations and 9 variables:

    maximize Z
      -    2 x0  +    1 x1                     -    2 x4                     -    5 x7           -  Z    = -3
00
      ----------------------------------------------------------------------------------------------------
--
      -    1 x0  -    8 x1          +    1 x3  +  9/2 x4                     +    2 x7                 =
60
      +    6 x0  -  1/3 x1                     +    3 x4          +  1 x6 +     1 x7                   =
48
      -    3 x0  +  3/4 x1                     +    2 x4                     -  8/3 x7 +    1 x8       =
60
      -  8/5 x0  +  5/3 x1 +    1 x2           -  8/3 x4                     -    2 x7                 =
48
      +    8 x0  +  5/2 x1                     +  3/4 x4 +    1 x5           + 10/3 x7                 =
48
           x0 ,       x1 ,     x2 ,      x3 ,       x4 ,     x5 ,      x6 ,      x7 ,     x8          >=
0
```

Suppose that variable x1 is the variable chosen to enter the basis.
Which variable or variables could be the next to *leave* the basis? Check all that apply.

☐ x2

This should not be selected

☑ x5

Correct
The basis is { x3, x6, x8, x2, x5 }.

The nonbasic variables are { x0, x1, x4, x7 }.

The entering variable is x1.

The min ratio test determines the leaving variable: min ratio = { *, *, 80, 144/5, 96/5 } = 96/5.

The minimum occurs in row 4, which corresponds to basic variable x5.

The leaving variables is x5.

☐ x7

Un-selected is correct

☐ x3

This should not be selected

☐ x6

This should not be selected

☐ x8

This should not be selected

☐ x1

Un-selected is correct

☐ x4

Un-selected is correct

☐ x0

Un-selected is correct