Started on	Friday, 10 November 2023, 2:30 PM
State	Finished
Completed on	Friday, 10 November 2023, 7:56 PM
Time taken	5 hours 26 mins
Grade	**3.60** out of 4.00 (**90**%)
Feedback	3.6/4

Question 1

Flag question Mark 0.40 out of 0.40 Correct

Removing the requirement of integer valued decision variables can improve the optimal objective function value.

Select one:
- True ✔
- False

The correct answer is 'True'.

Question 2

Flag question Mark 0.40 out of 0.40 Correct

In an optimal solution of a linear programming model, decision variables must take integer values.

Select one:
- True
- False ✔

The correct answer is 'False'.

Question 3

Flag question Mark 0.40 out of 0.40 Correct

MILP models can be used to capture some non-linear relationships among decision variables.

Select one:
- True ✔
- False

The correct answer is 'True'.

Question 4

Flag question Mark 0.40 out of 0.40 Correct

The reports below are from an LP model that a specialty retailer uses to decide how many of four different styles of umbrellas to stock in order to maximize profits (in euros). Specifically, the decision variables represent the number of women's (X1), golf (X2), men's (x3), and folding umbrellas (X4) to stock. It is assumed that every stocked umbrella will be sold. The four constraints model storage space, special display racks, demand, and marketing restrictions, respectively.

Adjustable Cells

Cell	Name	Final Value	Reduced Cost	Objective Coefficient	Allowable Increase	Allowable Decrease
A9	X1	3.6	0	12.7	2.1	11.7
B9	X2	0	-0.5	7.5	4.4	1E+30
C9	X3	2.9	0	2.4	8.5	1.2
D9	X4	3.7	0	6.7	5.8	1.675

Constraints

Cell	Name	Final Value	Shadow Price	Constraint R.H. Side	Allowable Increase	Allowable Decrease
E11	Storage	32	2.4	32	41	16
E12	Racks	76	0	38	1E+30	38
E13	Demand	67	5.7	67	58	16.75
E14	Marketing	12	-1.1	12	12	12

If the unit profit for women's umbrellas decreases to 2, what is the new total profit? Provide your answer with 2 decimal places. If there is not enough information to answer the question, then submit the answer "-99.99".

Answer: 38.95 ✔

The correct answer is: 38.95

Question 5

Flag question Mark 0.40 out of 0.40 Correct

B&B algorithm is solving an ILP problem and has found the solution $x_1=3$, $x_2=1.4$, $x_3=-4$, $z=-12.13$. Which of the below constraints will be used in the following steps of the algorithm?

Select one or more:
- a. $x_1>=3$
- b. $x_1<=3$
- c. $x_3<=-4$
- d. $x_3>=-4$
- e. $z<=-12$
- f. $x_2>=2$ ✔
- g. $z>=-12$
- h. $x_2<=1$ ✔
- i. $x_2>=1$

Your answer is correct.
The correct answers are:
$x_2<=1$,
$x_2>=2$

Question 6

Flag question Mark 0.40 out of 0.40 Correct

Rounding non-integer values of a feasible solution down to the nearest integer value will still result in a feasible solution to an integer linear programming maximization problem.

Select one:
- True
- False ✔

The correct answer is 'False'.

Question 7

Flag question Mark 0.40 out of 0.40 Correct

Some linear programming (LP) problems have a special structure which guarantees that the decision variables will have integer values at optimum without explicit integrality constrains.

Select one:
- True ✔
- False

The correct answer is 'True'.

Question 8

Flag question Mark 0.40 out of 0.40 Correct

An LP relaxation can contain non-linear constraints.

Select one:
- True
- False ✔

The correct answer is 'False'.

Question 9

Flag question Mark 0.40 out of 0.40 Correct

Consider the graphical representation of a network LP model. Which one of the following statements is correct?

Select one:
- a. Arcs correspond to decision variables, nodes to constraints ✔
- b. Nodes correspond to decision variables, arcs to constraints

Your answer is correct.
The correct answer is: Arcs correspond to decision variables, nodes to constraints

Question 10

Flag question Mark 0.00 out of 0.40 Incorrect

A company has decided to use 0-1 integer programming to help make some investment decisions. There are three possible investments from which to choose. The binary linear programming model is as follows:

Maximize $5000X_1 + 7000X_2 + 9000X_3$

$16X_1 + 14X_2 + 19X_4 <= 36$,

where $X_i = 1$ if investment i is selected and 0 otherwise.

Suppose we want to extend the model so that if both investments 1 and 2 are selected then their combined resource consumption is only 25. Which one of the following changes to the model is NOT correct:

Select one:
- a. Add constraint "$X_1 + X_2 - 2X_4 <= 1$"
- b. Change the first constraint to "$16X_1 + 14X_2 + 19X_3 - 5X_4 <= 36$ "
- c. Add constraint "$X_1 + X_2 - 2X_4 >= 0$"
- d. Add constraint "$X_1 + X_2 - 2X_4 >= 1$"
- e. Add constraint "$0.5X_1 + 0.5X_2 - X_4 <= 0.5$" ✘

Your answer is incorrect.
The correct answer is:
Add constraint "$X_1 + X_2 - 2X_4 >= 1$"

Finish review