Quiz 6

Due May 17 at 11:59pm **Points** 8 **Questions** 8
Available May 8 at 11:59pm - May 17 at 11:59pm 9 days **Time Limit** 15 Minutes

This quiz was locked May 17 at 11:59pm.

Attempt History

	Attempt	Time	Score
LATEST	Attempt 1	13 minutes	8 out of 8

Score for this quiz: **8** out of 8
Submitted May 15 at 8:51pm
This attempt took 13 minutes.

Question 1

1 / 1 pts

Which point is in the feasible region for the constraints:

$x + y < 10$

$2x - 3y < 8$

$x, y > 0$

- (8, 6)
- Correct! (4,4)
- (10, 0)
- (4, 10)

Question 2

1 / 1 pts

Which point maximizes the objective function:

max x + 5y

subject to the constraints

x + 2y <= 10

4x + y <= 12

x, y >= 0

- (2,6)
- (1,3)
- Correct! (0,5)
- (2,4)
- (3,0)

Question 3

1 / 1 pts

The Acme Company produces four types of widgets: A, B, C and D. The profit per widget and the resource usage of each type of widget is given in the table below:

Widget Type	**A**	**B**	**C**	**D**
profit ($)	10	15	7	8
Labor (hrs)	2	1	3	1.5
Material (lbs)	3	2.5	6	5
Water	10	12	8	9

(gallons)				

There are 100 hours of labor, 500 lbs of material and 1000 gallons of water available. If the goal is to maximize the total profit then the objective function is: (the variables A, B ,C & D are the number of widgets of each type produced)

Correct!

- max 10A + 15B + 7C + 8D
- min 10A + 12B + 8C + 9D
- min 10A + 15B + 7C + 8D
- max A + B + C + D

Question 4

1 / 1 pts

The Acme Company produces four types of widgets: A, B, C and D. The profit per widget and the resource usage of each type of widget is given in the table below:

Widget Type	**A**	**B**	**C**	**D**
profit ($)	10	15	7	8
Labor (hrs)	2	1	3	1.5
Material (lbs)	3	2.5	6	5
Water (gallons)	10	12	8	9

There are 100 hours of labor, 500 lbs of material and 1000 gallons of water available. The constraint associated with labor is:

- 2A + B + 3C + 1.5D <= 500
- 2A + B + 3C + D = 100

- A + B + C + D <= 100

Correct!

- 2A + B + 3C + 1.5D <= 100

Question 5

1 / 1 pts

The solutions to a linear programming problem will always be integers?

- True

Correct!

- False

Question 6

1 / 1 pts

Consider the following linear programming problem:

max x+ y + z

subject to

2x + 3y + z > 100

x < 10

z, y >= 0

select the following that best describes it's solution(s).

- Infeasible
- One optimal solution

Correct!

- Unbounded
- Two optimal solutions

Question 7

1 / 1 pts

Consider the single-pair shortest path problem in a weighted directed graph G=(V, E) from a vertex ***s*** to ***t***, where ***s*** denotes the source vertex and ***t*** represents the target/sink vertex. Let d_v denote the distance of any vertex *v* from the source vertex ***s***. Moreover, let *w(u,v)* represent the weight of the edge *(u,v).* For each vertex z $\neq$ ***s***, consider the set $Distances_z$, where

$Distances_z$ = { $d_{(u,z)}$ | where $d_{(u,z)} = d_u + w(u,z)$ for each edge (u,z) in E }

To solve the single-pair shortest path problem using linear programming, we create the following linear program:

maximize d_t

subject to

$d_v - d_u <= w(u,v)$ for each edge *(u,v)* in E

$d_s = 0$

Is it ok that we maximize d_t ? Why?

Select all that applies.

- [ ] No. We should formulate it as a minimization linear program.

Correct!

- [x] Yes, because minimizing it would result in an optimal solution where the distances of all vertices would be zero.

Correct!

- [x] Yes, because an optimal solution requires the distance of the vertex z (i.e., d_z) to be the largest value that is less than or equal to the minimum of the values in $Distances_z$.

- [ ] Yes, because both minimization and maximization would find the shortest path.

Question 8

1 / 1 pts

Consider the following linear programming problem:

max x+ y

subject to

|x - y| =< 20

x , y >= 0

select the following that best describes it's solution(s).

- ○ One optimal solution
- ○ Infeasible
- ◉ Unbounded (Correct!)
- ○ Two optimal solutions

Quiz Score: **8** out of 8