

Linear Programming Quiz | Coursera

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Linear Programming Quiz  
Graded Quiz • 10 min

Due Jun 23, 12:29 PM IST

✓ **Congratulations! You passed!**  
TO PASS: 60% or higher

Keep Learning

GRADE  
80%

## Linear Programming Quiz

LATEST SUBMISSION GRADE  
80%

1. What is the minimum number of linear inequalities needed to define the figure pictured below?

1 / 3 points



8

✓ Correct

The figure is cut out by 8 flat surfaces. Thus 8 equations are needed.

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✓ Correct  
The figure is cut out by 8 flat surfaces. Thus 8 equations are needed.

2. Given a solution to a linear program, one could try to show that it is optimal by finding a matching solution to the dual program. Which of the following theorems will make it easier to do so?

1 / 3 points

☐ Polytopes achieve optimum values at vertices.

☒ Complementary slackness.

☐ Separation of convex sets from outside points by hyperplanes.

✓ Correct  
Correct! Complementary slackness tells you that your dual solution only uses equations that are tight in solutions to the primal.

3. Which of the following statements are true?

1 / 3 points

☒ A system of linear equations has a solution unless they can be combined in some combination to give the equation  $0=1$ .

✓ Correct  
This statement is true. There is a solution unless the corresponding row reduced matrix has a row corresponding to this equation; this will happen only if  $0=1$  can be obtained by combining the original equations.

✓ Correct  
Correct! Complementary slackness tells you that your dual solution only uses equations that are tight in solutions to the primal.

3. Which of the following statements are true?

1 / 1 point

☒ A system of linear equations has a solution unless they can be combined in some combination to give the equation  $0=1$ .

✓ Correct  
This statement is true. There is a solution unless the corresponding row reduced matrix has a row corresponding to this equation, this will happen only if  $0=1$  can be obtained by combining the original equations.

☒ A system of linear equations has always 0, 1, or infinitely many solutions.

✓ Correct  
This statement is true. Unless there are no solutions, the solution set has some number of free variables. If there are no free variables, there is a unique solution. If there is at least one free variable, there are infinitely many solutions.

☐ A system of  $n$  linear equations in  $n$  variables always has a unique solution.

4. Suppose that you are trying to solve the optimization problem:

0 / 1 point

Maximize  $c^T x$  subject to  $Ax \geq b$  for some  $A \in \mathbb{R}^{m \times n}$  (i.e. trying to solve an optimization problem in  $n$

5. What is the largest possible value of  $x+y$  achievable by pairs  $(x,y)$  of real numbers satisfying the constraints:

1 / 1 point

- $x \leq 7$
- $y \leq 10$
- $2x+y \leq 21$
- $x+2y \leq 12$
- $3x+y \leq 30$

15

✓ Correct  
Correct. The optimum is at  $x=6, y=9$  as shown below.

