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

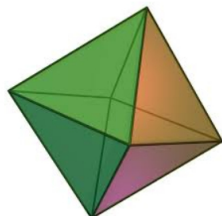**Keep Learning**

GRADE
60%

Linear Programming Quiz

LATEST SUBMISSION GRADE

60%

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

    `1 / 1 point`

    8

    ✓ **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 / 1 point`

    ○ 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 / 1 point`

    ☑ 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 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 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 $v \cdot x$ subject to $Ax \geq b$ for some $A \in \mathbb{R}^{m \times n}$ (i.e. trying to solve an optimization problem in n variables with m linear inequality constraints).

    This problem can be reduced to running a solution finding algorithm on a different system of linear equations in k variables. What is the smallest value of k for which this can be done?

    m

m

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

0 / 1 point

- x <= 7
- y <= 10
- 2x+y <= 21
- -x + 2y <= 12
- 5x-y <= 30

No answer