SOLUTIONS TO EXERCISES

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Chapter 2.

1. A linear program is the maximization or minimization of a linear function subject to linear constraints. A constraint reduces the feasible region of the linear function. The equation reduces the activity space, whereas the inequality does not.

2. Because the inequality constraints do not decrease the dimension of the solution space, we have $7 - 2 = \mathbf{5}$ as the dimension of the solution space.

3. It **is not consistent** because there is no feasible solution.

4. It is **redundant**. Solving, we get the solution of $(x_1, x_2, x_3) = (t - 2, 3t - 4, t)$, where t is a free variable. This tells us that the dimension of the solution is 1 and the set of equations were not linearly independent.

5. It is **consistent** and **nonredundant**. The solution is $(x_1, x_2, x_3) = (0.3, 0.4, 0)$.

6. We have that (2-7) and (2-8) are equivalent, but (2-9) is not equivalent because the operation performed was not a valid row operation.