Introduction to Optimization. HW#3. **Due: Wednesday, April 30, 2025**

1. Page 49, Exercise 3-1-2
2. Page 53, Exercise 3-2-1
3. Page 55, Exercise 3-3-2
4. Page 59, Exercise 3-3-5.
5. Page 60, Exercise 3-3-6
6. Page 64, Exercise 3-4-2
7. Page 65, Exercise 3-4-4

Notice that it is possible that:

- the feasible region of a LP is empty
- the feasible region of a LP is non-empty, in this case the region can be a bounded or an unbounded set
- the minimum value of a LP is $-\infty$, the authors use the phrase "the problem is unbounded" or "the objective function is unbounded below on the feasible region" to describe this situation.
- the set of minimizers of a LP is non-unique. In this case, the set of minimizers can be a bounded or unbounded (convex) set. In the former case, the minimum value must be bounded. But in the latter case, the minimum value can be bounded or unbounded.

For the LP in Exericse 3-3-5, which case(s) does it correspond to?

Of course, it is impossible that:

- the set of minimizers is an unbounded set when the feasible set is a bounded set. (The former is a subset of the latter.)
- the minimum value is $-\infty$ when the feasible region is bounded.

In the midterm exam, you may encounter questions on some of these situations.