Homework 2

Due date: Wednesday, October 31

Warning: Problem 4.8 might be a little long! So you might want to start early.

1. Show that a function is convex if and only if its restriction to an arbitrary line is convex. Use this property to establish the following.

   - $f(X) = \mathrm{tr}(X^{-1})$ is convex on S^n_{++}.
   - $(\det X)^{1/n}$ is concave on S^n_{++}.

   Hint: The examples in section 3.1.5. may be useful here.

2. Boyd and Vandenberghe, Chapter 3, Problem 3.34.

3. Boyd and Vandenberghe, Chapter 4, Problem 4.3.

4. Boyd and Vandenberghe, Chapter 4, Problem 4.8.

5. Boyd and Vandenberghe, Chapter 3, Problem 4.12.

6. Boyd and Vandenberghe, Chapter 4, Problem 4.25.