14. Work on problems 1 and 2 of Section 3.9 in the textbook.

15. Consider the LP

$$\begin{cases} c^{*T}x \to \min \\ A^*x \le b^* \\ x \ge 0 \end{cases}$$

with

$$c^* = \begin{pmatrix} 1 \\ 1 \\ 1 \end{pmatrix}, \quad b^* = \begin{pmatrix} 1 \\ -1 \\ 2 \end{pmatrix}, \quad A^* = \begin{pmatrix} 1 & 2 \\ 4 & 3 \\ 5 & 6 \end{pmatrix}.$$

Find A, b und c, such that (LP) is in the following form:

(i) $\begin{cases} c^T x \to \min \\ Ax \ge b \\ x \ge 0 \end{cases}$ (ii) $\begin{cases} c^T x \to \max \\ Ax \le b \\ x \ge 0 \end{cases}$ (iii) $\begin{cases} c^T x \to \min \\ Ax = b \\ x \ge 0 \end{cases}$ (iv) $\begin{cases} c^T x \to \min \\ Ax = b > 0 \\ x \ge 0 \end{cases}$.

16. Find all basic solutions and all bfs of $Ax = b$ with

$$A = \begin{pmatrix} 2 & 1 & 1 & 1 & 1 \\ 2 & 2 & 1 & 1 & 0 \\ 1 & 1 & 0 & 1 & 0 \end{pmatrix}, \quad b = \begin{pmatrix} 4 \\ 3 \\ 2 \end{pmatrix}.$$

17. Show that the set

$$\{x \in \mathbb{R}^4 \ : \ 3x_1 + x_4 = 0, \ x_2 + x_3 - 3x_4 = 0, \ x_1 - x_3 = 0\}$$

is convex and find all of its extreme points.

18. Work on problem 3 of Section 4.2 in the textbook.