Finite Mathematics

Homework 1

Due in class Wednesday, February 12, 2020

Note: Assignments marked (*) are *not* for bonus credit. They will not be graded. Do not turn them in. However, they will be discussed in the tutorial and typically example solutions are available online (in case of Hefferon's book, there is a PDF with solutions available on the book's web site.)

1. *Hefferon, p. 41, Excercises 1.2, 1.3, 1.4

2. Find a parametric description of the plane which goes through the point

$$\begin{pmatrix} 1 \\ -1 \\ 0 \end{pmatrix}$$

   and the line with parametric description

$$\boldsymbol{x} = \begin{pmatrix} 4 \\ 0 \\ -4 \end{pmatrix} + \lambda \begin{pmatrix} 3 \\ 2 \\ 1 \end{pmatrix}.$$

   (Cf. *Hefferon p. 41, Exercise 1.6) $\hspace{2cm}$ (3)

3. VMLS, p. 25, Exercise 1.7 $\hspace{2cm}$ (2)

4. VMLS, p. 26, Exercise 1.12 $\hspace{2cm}$ (3)

5. *VMLS, p. 27, Exercise 1.16

6. *VMLS, p. 42, Exercise 2.1

7. Recall from class that an affine function $f \colon \mathbb{R}^n \to \mathbb{R}$ can be written as $f(\boldsymbol{x}) = \boldsymbol{a}^T \boldsymbol{x} + b$ for some $\boldsymbol{a} \in \mathbb{R}^n$ and $b \in \mathbb{R}$. Verify that $b = f(0)$ and

$$\boldsymbol{a} = \begin{pmatrix} f(\boldsymbol{e}_1) - f(0) \\ \vdots \\ f(\boldsymbol{e}_n) - f(0) \end{pmatrix}.$$

$\hspace{2cm}$ (2)