Reading. §6.4–6.6.

Problems from the book:

- 6.3.10, 6.3.11
- 6.4.1, 6.4.2, 6.4.4, 6.4.7
- 6.5.4, 6.5.11, 6.5.15, 6.5.18

Additional problems:

1. Let **0** denote the vector space whose only vector is the zero vector. Suppose there is a sequence of finite dimensional vector spaces and linear maps

$$V_0 = \mathbf{0} \xrightarrow{T_0} V_1 \xrightarrow{T_1} V_2 \xrightarrow{T_2} \cdots \xrightarrow{T_{n-2}} V_{n-1} \xrightarrow{T_{n-1}} V_n \xrightarrow{T_n} \mathbf{0} = V_{n+1} \ .$$

We say that the sequence is exact at V_i if $\ker(T_i) = \operatorname{im}(T_{i-1})$, and it is **exact** if it is exact at each V_i. Prove that if the above sequence is exact, then

$$\sum_{i=1}^{n} (-1)^i \dim(V_i) = 0.$$