exercise 1:
Use the definition of convergence to show that the sequence $a_n = \frac{1}{n^2}$ converges.

exercise 2:
Use the definition of convergence to show that a constant sequence is convergent.

exercise 3:
Use the definition of convergence to show by contradiction that the sequence $a_n = (-1)^n$ diverges.

exercise 4:
Let b_n be a sequence in $\mathbb{R}$. Show that these two statements are equivalent.

(i). $\exists M \in \mathbb{R}, \quad \forall n \in \mathbb{N}, \quad |b_n| \leq M.$
(ii). $\exists A, B \in \mathbb{R}, \quad \forall n \in \mathbb{N}, \quad A \leq b_n \leq B.$

exercise 5:
(i). Let a_n and b_n be two convergent sequences such that $a_n \leq b_n$ for all n. Show that $\lim a_n \leq \lim b_n$.
(ii). Prove or disprove: Let a_n and b_n be two convergent sequences such that $a_n < b_n$ for all n. Then $\lim a_n < \lim b_n$.

exercise 6:
From the textbook: (1.1) a, c, i, e.