1. Prove that if \( f \in R[a, b] \), then \(|f| \in R[a, b]\) and
\[
|\int_a^b f| \leq \int_a^b |f|.
\]

2. Prove the following theorem. If \( f : [a, b] \to \mathbb{R} \) is continuous, then \( f \) is Riemann integrable on \([a, b]\).

3. Prove (using the definition) that a constant function
\[
f(x) = c, \ c \in \mathbb{R}
\]
is Riemann integrable on any interval \([a, b]\) and
\[
\int_a^b f(x)dx = c(b - a).
\]

4. Give an example of a function \( f : [a, b] \to \mathbb{R} \) which is not Riemann integrable on \([a, b]\), but \(|f|\) is Riemann integrable on \([a, b]\).

5. Prove that if a function \( f : [a, b] \to \mathbb{R} \) has exactly one discontinuity and this discontinuity is in the open interval \((a, b)\), then \( f \) is Riemann integrable on \([a, b]\).