Math 131BH Spring 2018: Homework 6, Due 5/16

1-4. p166, Rudin 19 (Here "uniformly closed" means closed under the sup norm), 20, 22, 25.

5. Show that there exists a continuous function $u : \mathbb{R} \to \mathbb{R}$ that satisfies the following:

For any $f \in C([0,1])$ and given $\varepsilon > 0$, there exists a constant $c \in \mathbb{R}$ such that

$$\sup_{x \in [0,1]} |f(x) - u(x+c)| < \varepsilon.$$

Note that the function u should not depend on the choice of f or ε.