Problems to be done but not turned in: 15.1, 15.3, 15.5, 15.7; 17.1, 17.3, 17.5, 17.7, 17.9, 17.11, 17.13, 17.15.

Problems to be turned in: All numbers refer to exercises in Ross.

1. Ex. 15.4(a,c).

2. Ex. 15.6.

3. Let \( f : \mathbb{R} \to \mathbb{R} \) be defined by \( f(x) = \sqrt[3]{x} \). Use the definition of continuity to prove that \( f \) is continuous at 0.

4. For a nonempty \( A \subseteq \mathbb{R} \) and \( K > 0 \), we say that a function \( g : A \to \mathbb{R} \) is \( K \)-Lipschitz if for any \( x, y \in A \), we have
   \[
   |g(x) - g(y)| \leq K |x - y|.
   
   Let \( A \subseteq \mathbb{R} \) be nonempty and \( K > 0 \), and suppose that \( g : A \to \mathbb{R} \) is \( K \)-Lipschitz. Prove that \( g \) is continuous on \( A \) (i.e., at every \( a \in A \)).

5. Ex. 17.10(b,c).

6. Let \( h : \mathbb{R} \to \mathbb{R} \) be defined by
   \[
   h(x) = \begin{cases} 
   \sqrt[3]{x} \sin \left( \frac{1}{x} \right) & \text{if } x \neq 0, \\
   0 & \text{if } x = 0.
   \end{cases}
   
   Prove or disprove: \( h \) is continuous at 0.

7. Ex. 17.12.