Instructions: Your written work is expected to be neat and clear. Explain your work where necessary. Pay special attention to writing clear, concise and complete proofs.

1. §1.2 #s 1a, b, c, d, h, i, 13, 17, 18, 20
2. §1.3 # 1a, d, 5, 8a, e, 13, 23, 25, 30

3. A function \( f: [a, b] \to \mathbb{R} \) is called even on \( [a, b] \) if \( f(a + x) = f(b - x) \), \( \forall x \in [0, \frac{b-a}{2}] \). (That is, the graph of \( f \) is symmetric with respect to the line \( x = \frac{a+b}{2} \). Notice that this is a generalization of the definition that you learned in calculus; in calculus we usually study symmetry of functions on intervals of the form \([-a, a]\).)
   a. Prove that the set of even functions, \( E([a, b], \mathbb{R}) \), is a subspace of the set of all functions defined on \([a, b]\), \( \mathcal{F}([a, b], \mathbb{R}) \).
   b. Give the definition of an odd function on \([a, b]\).
   c. Prove that the set of odd functions, \( O([a, b], \mathbb{R}) \), is a subspace of \( \mathcal{F}([a, b], \mathbb{R}) \).
   d. Prove that \( \mathcal{F}([a, b], \mathbb{R}) = E \oplus O \).