

**Math 165: Honors Calculus I**  
**Assignment 10** *Sept. 22, 1999*

1. Let  $A$  and  $B$  be subsets of real numbers each of which has an infimum. Let  $C = \{a + b \mid a \in A, b \in B\}$ . Prove that  $C$  has an infimum and  $\inf C = \inf A + \inf B$ . (The proof of the corresponding theorem for supremum, Theorem I.33 (a), is given on p.27.)

2. Define

$$f(x) = \begin{cases} 0 & \text{if } x = 1/n \text{ for some } n \in \mathbb{N} \\ 1 & \text{otherwise} \end{cases}$$

Prove or disprove that  $f(x)$  is integrable on  $[0, 1]$ .

3. Use Theorem 1.14 to find an approximation to the integral  $\int_1^2 \frac{1}{x} dx$  so that the error is  $< .05$ . You may use a calculator or computer, but you must prove the accuracy of your approximation.