

## HOMEWORK ASSIGNMENT

All the assignments are from the textbook, unless otherwise specified.

- Week 1: page 13 # 1,3,4,5,6,7.

Due date: Friday, February 2

- Week 2: page 37 # 1,4,7,9, page 48 # 5,7,10,11.

Due date: Friday, February 9 (extended to Monday, February 12)

- Week 3: page 54 # 2,3,7,10, page 84 # 1,2,4,7,11.  
Reading Assignment: Theorem 3.1.2

Due date: Friday, February 16

- Week 4: page 98 # 1,2,4,5,10,14, page 106 # 1,2,3,6. Solve the following exercise:

**Exercise.** Show that any perfect set  $P \subset \mathbb{R}$  is uncountable.

**Hint:** Denote by  $\bar{V}$  the closure of a set  $V$  (defined on page 97).

- (1) Show first that if  $V$  is open and  $V \cap P \neq \emptyset$ , then  $V \cap P$  is infinite.
- (2) Assume that  $P = \{x_1, x_2, \dots\}$  is countable. Using Part (1), show that there exists a sequence of open sets  $V_1, V_2, \dots$  such that  $V_n \cap P \neq \emptyset$ ,  $\bar{V}_{n+1} \subset V_n$  and  $x_n \notin \bar{V}_{n+1} \cap P$ .

Due date: Friday, February 23

- Week 5: Since there is a test on February 26th, this week assignment will be shorter: page 126 # 7,8, page 138 # 3,4.  
Reading Assignment: Section 4.1.3.

Due date: Friday, March 2nd

- Week 6: page 126 # 2,11, page 138 # 8, page 152 # 1,5,6,7.  
Reading Assignment: Section 4.2.3 (statements only). Theorem 4.2.4.

Due date: Friday, March 9th

- Week 7: page 164 # 2, 8, 11 page 176, # 1, 3, 5, 10.  
Reading Assignment: Section 5.3.1.

Due date: Friday, March 23

- Week 8: page 192, # 1, 3, 14.  
Reading Assignment: Section 5.4.1.  
  
Due date: Friday, March 30th
- Week 9: page 217, # 1, 2, 4, 12, page 231 # 3, 6, 9(a), 11.  
  
Due date: Friday, April 6th
- Week 10: page 235, # 1, 3, page 250, #7 (there is a typo there!).  
  
**Exercise.** Let  $f$  be a bounded function on  $[a, b]$ . Show that
$$\text{Osc}\{|f|, P\} \leq \text{Osc}\{f, P\},$$
for all partitions  $P$  of  $[a, b]$ .  
  
Due date: Friday, April 13th
- Week 11: page 262, # 1, 5, page 274 # 2, 3, 7  
  
Due date: Friday, April 20th
- Week 12: page 275 # 8, 9, page 294, # 1, 2, 7(a), 8(a).  
  
Due date: Friday, April 27th