MATH 4433 Homework 3 Due 9/11/2014

Section 2.1: Exercises 6, 17. Hints and remarks:

- in Exercise 6 it is enough to give only give formal derivations using the properties of the set operations, without further explanations; feel free to use the shorter notation A^c instead of $U \setminus A$; Theorem 2.1.13 will be useful; the equalities $(B \cup C)^c = B^c \cap C^c$ and $(B \cap C)^c = B^c \cup C^c$ (which follow from parts (f) and (g) of Theorem 2.1.13) are sometimes called De Morgan's laws;[1]
- in each part of Exercise 17, draw a Venn diagram and then give a formal proof (if the statement in this part allows you to conclude that $x \notin A \setminus B$).

Section 2.2: Exercises 11(d,f,h), 14, 23. Hints and remarks:

- in Exercise 11(d,f,h) you have to state clearly whether the relation is reflexive, symmetric, and transitive; in Exercise 11(f) you may use the results of Exercise 1.4/20 (in which the correct answers are: (a) is F, (b) is T, (c) is F, (d) is T).

Section 2.3: Exercises 2(a,c), 3(b,d), 6, 7(d,g), 14. Hints and remarks:

- in Exercise 6 drawing graphs and giving very brief explanations is enough;
- in exercise 7(d) you may use derivatives.

Food for Thought:

- Sec. **2.1**, exercises 10, 19, 25;
- Sec. **2.2**, exercises 6(a,e), 9, 13, 31(c,f) [31(c) is True, 31(f) is False];
- Sec. **2.3**, exercises 7(a,c), 9(a,d), 15, 16.

[1] In logic, the tautologies $[\sim (p \wedge q)] \Leftrightarrow [(\sim p) \vee (\sim q)]$ and $[\sim (p \vee q)] \Leftrightarrow [(\sim p) \wedge (\sim q)]$ are sometimes called De Morgan's laws.