

**Examlet 2      Foundations of Advanced Math      2/24/12**

1. a) For any set  $A$ ,  $A - A = \emptyset$ .

b) For any sets  $A$  and  $B$ , if  $A - B = \emptyset$ , then  $A = B$ .

2. Let  $C_n = (n - 2, n + 2)$  for each  $n \in \mathbb{N}$ .

a) What is  $\bigcup_{i \in \{1,2,3\}} C_i$ ?

b) What is  $\bigcap_{i \in \{1,2,3\}} C_i$ ?

c) What is  $\bigcup_{i \in \mathbb{N}} C_i$ ?

d) What is  $\bigcap_{i \in \mathbb{N}} C_i$ ?

3. Suppose that  $a, b \in \mathbb{R}$ . If  $a, b > 0$ , then  $\sqrt{ab} \leq \frac{a+b}{2}$ .

4. Suppose that  $A_i \subseteq B_i$  for all  $i \in I$ . Then  $\bigcap_{i \in I} A_i \subseteq \bigcup_{i \in I} B_i$ .

5. a) State the Triangle Inequality.

b) For all  $x, y, z \in \mathbb{R}$ ,  $|x + y + z| \leq |x| + |y| + |z|$ .

