

**Examlet 3      Foundations of Advanced Math      3/28/14**

1. a) State the definition of an injection.

b) State the definition of a surjection.

c) State the definition of equipollent sets.

d) State the definition of a denumerable set.

e) State the definition of a countable set.

2. a) Let  $f$  and  $g$  be bounded functions, both with domain  $D$ . Then  $f + g$  is a bounded function.

b) Let  $m \in \mathbb{N}$ , and let  $f_i$  be a bounded function from  $D$  to  $\mathbb{R}$  for each  $i \in \{n \in \mathbb{N} \mid n \leq m\}$ .

Then  $\sum_{i=0}^m f_i$  is a bounded function.

3. If  $f:A \rightarrow B$  and  $g:B \rightarrow C$  are injective functions, then  $g \circ f$  is injective.

4. In class we used the fact that  $f(n) = \frac{n-1}{2}$  is a bijection from the odd naturals to the naturals. Prove that it is.

5. If  $A$  is equipollent to  $B$ , then  $B$  is equipollent to  $A$ .

