

**Examlet 3a      Foundations of Advanced Math      3/24/17**

1. a) State the definition of sets  $A$  and  $B$  being **equipollent**.

b) Give five distinct examples of sets equipollent to  $\mathbb{N}$ .

2. The composition of two injective functions is injective.

3. The composition of two surjective functions is surjective.

4. Let  $f(x) = \sqrt{4 + 2x}$ . What is the inverse function for  $f$ , and what are its domain and codomain?

5. a) Let  $f_1: \mathbb{R} \rightarrow \mathbb{R}$  and  $f_2: \mathbb{R} \rightarrow \mathbb{R}$  be even functions. Then  $f_1 + f_2$  is an even function.

b) Let  $n \in \mathbb{N}$ , and  $f_i: \mathbb{R} \rightarrow \mathbb{R}$  be an even function for each  $i \in \{x \in \mathbb{N} \mid 1 \leq x \leq n\}$ . Then

$\sum_{i=1}^n f_i$  is an even function.

