

1. a) State the definition of a surjection.

b) Give an example of a function from  $\mathbb{N}$  to  $\mathbb{N}$  which is injective, or make it clear why it is not possible.

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

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

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

4. a) If  $f: A \rightarrow B$  has an inverse function  $g$ , then  $g$  has  $f$  as an inverse function also.

b) Let  $f: \mathbb{N} \rightarrow \mathbb{N}$  be defined by  $f(n) = 5$  for all  $n \in \mathbb{N}$ . Find the inverse function of  $f$ , or explain why one doesn't exist.

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

