

## MATH 1101 HOMEWORK 2

Due Feb 20, 2006

1.
  - (a) What is a function? Give a definition.
  - (b) Give two examples of functions whose domains and codomains are not sets of numbers. Explain why your examples are indeed functions.
  - (c) Give two functions  $f$  and  $g$  whose domains and codomains are not sets of numbers and which can be composed as  $g \circ f$ . Explain why they can be composed and describe the composite function.
  - (d) Give two functions  $f$  and  $g$  whose domains and codomains are not sets of numbers and which cannot be composed as  $g \circ f$ . Explain why they cannot be composed.
2.
  - (a) Let  $f : S \rightarrow T$  be a function. How can you tell if  $f$  is one-to-one?
  - (b) Let  $f : S \rightarrow T$  be a function. How can you tell if  $f$  is onto?
  - (c) Give an example of a function that is one-to-one and onto. Justify your answer.
  - (d) Give an example of a function that is one-to-one but not onto. Justify your answer.
  - (e) Give an example of a function that is onto but not one-to-one. Justify your answer.
  - (f) Give an example of a function that is neither one-to-one nor onto. Justify your answer.
3. Give an example of an invertible function  $f$  whose domain and codomain are not sets of numbers. Describe  $f^{-1}$  (including its domain and codomain) and explain why it is a function.