

Math 2001 Assignment 36

Your name here

Due Wednesday, November 19

Reading 1. Scheinerman, §26

Problem 2. Prove that the following function $f : \mathbb{Z} \rightarrow \mathbb{N} \times \mathbb{N}$ is injective:

$$f(x) = \begin{cases} (x, 0) & x \geq 0 \\ (0, -x) & x < 0 \end{cases}$$

Problem 3. Scheinerman, §25, #16

Problem 4. Scheinerman, §24, #24

Problem 5. Suppose that $f : A \rightarrow B$ and $g : B \rightarrow C$ are functions. For all $a \in A$, let $h(a) = g(f(a))$.

- (i) Verify that h is a function from A to C .
- (ii) Prove: If f and g are both injective then h is injective.
- (iii) Prove: If f and g are both surjective then h is surjective.
- (iv) Prove: If f and g are bijections then h is a bijection. Give a formula for h^{-1} in terms of f^{-1} and g^{-1} .