

Worksheet 11
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Questions and Exercises

Let $U = \mathbb{R} \times \mathbb{R}$

1. Consider the function $f : \mathbb{N} \rightarrow \mathbb{R}$ defined by:

$$f(x) = 3 \cdot x^2 + 1$$

- A. Prove or disprove f is injective
- B. Prove or disprove f is surjective
- C. Prove or disprove f is bijective

2. Consider the function $g : \mathbb{R} \rightarrow \mathbb{R}$ defined by:

$$g(x) = 4 \cdot x - 2$$

- A. Prove or disprove g is injective
- B. Prove or disprove g is surjective
- C. Prove or disprove g is bijective

3. Consider the function $k : \mathbb{N}_6 \rightarrow \mathbb{N}_6$ defined by:

$$k = \{(1, 2), (2, 3), (3, 4), (4, 5), (5, 5), (6, 5)\}$$

- A. Prove or disprove k is injective
- B. Prove or disprove k is surjective
- C. Prove or disprove k is bijective
- D. Prove or disprove k^{-1} is a well defined function

4. Consider the function $g : \mathbb{R} \rightarrow \mathbb{R}$ defined by:

$$g(x) = 4 \cdot x - 2$$

Find $g|_{\mathbb{N}_5}$

5. Consider the function $f : \mathbb{N} \rightarrow \mathbb{R}$ defined by:

$$f(x) = 3 \cdot x^2 + 1$$

In the plane $U = \mathbb{R} \times \mathbb{R}$ graph $f|^{[-2, \infty)}$