

Math 220 – Homework 10

PART A

Problems from the textbook:

- # 9.30, 9.32, 9.54, 9.64, 9.70

PART B

1. Determine whether the following function is injection. Give a formal proof of your answer.

(a) $f : \mathbb{R} \rightarrow \mathbb{R}$ defined by $f(x) = 16x^{16} - 14x^{14} - 2x^2 + 1$

(b) $f : \mathbb{Z} \rightarrow \mathbb{Z}$ defined by $f(n) = \begin{cases} n + 2018, & \text{if } n \in \mathbb{E} \\ -n + 2018, & \text{if } n \in \mathbb{O} \end{cases}$

2. The functions $f, g : \mathbb{R} \rightarrow \mathbb{R}$ defined by $f(x) = 2x + 1$ and $g(x) = 3x - 5$ are bijective. Determine the inverse function of $g \circ f^{-1}$.

3. Let $a, b \in \mathbb{R} - \{0\}$ and let functions $f, g : \mathbb{R} \rightarrow \mathbb{R}$ be defined by

$$f(x) = ax + b, \quad g(x) = x + \frac{b}{a}.$$

Compute the *inverse* function of $g \circ f^{-1}$.