

MATH310 Homework 2022-07-29
Due Gradescope 11:59pm 2022-08-02

1. Define the relation:

$$R = \{(x, y) \in \mathbb{R} \times \mathbb{R} \mid x = |y|\}$$

[25 pts]

Give two reasons why R is not a function.

2. Give an example of an equivalence relation which is also a function. Can you think of more than one? Explain. [25 pts]

3. Define the function $f(x) = \lfloor x \rfloor$. Prove or disprove: $f(xy) = f(x)f(y)$. [25 pts]

4. Suppose $A, B \subseteq U$. Prove that:

$$\chi_{\overline{A \cup B}}(x) = \chi_{\overline{A}}(x)\chi_{\overline{B}}(x)$$

[25 pts]