Dec 1, 2010

METU, Fall 2010, Math 111, Section 1.

Quiz 3

1. Let f be a function from A to B. A function $g : B \to A$ is called a *left inverse* of f if $g \circ f = \mathrm{id}_A$. Show that

$$f \text{ has a left inverse } \iff f \text{ is injective.}$$

- (f has a left inverse $\Rightarrow$ f is injective)

- (f is injective $\Rightarrow$ f has a left inverse)

2. For each positive real number r, let

$$D_r = \{(x, y) \in \mathbb{R} \times \mathbb{R} : |x - y| < r\}.$$

Answer the following questions. Don't forget to **justify your answers**.

- Is D_r a relation on $\mathbb{R}$?

- Is D_r reflexive?

- Is D_r symmetric?

- Is D_r transitive?

- Is D_r an equivalence relation?